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Benefits of regional and unitary council biosecurity interventions

Final report to Te Uru Kahika

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Definitions

BCR	Benefit-Cost Ratio
BMI	Browse Magnitude Index
BOPRC	Bay of Plenty Regional Council
CBA	Cost-Benefit Analysis
CNG	Chilean Needle Grass (*Nassella neesiana*)
CTB	Council Territorial Board
DOC	Department of Conservation
ECan	Environment Canterbury
ES	Environment Southland
FTE	Full-Time Equivalent
GDP	Gross Domestic Product
GDC	Gisborne District Council
GWRC	Greater Wellington Regional Council
HBRC	Hawke's Bay Regional Council
HRC	Horizons Regional Council
HVA	High Value Area
IRR	Internal Rate of Return
KNE	Key Native Ecosystem
LWP	Land Water People Ltd
MDC	Marlborough District Council
MPI	Ministry for Primary Industries
NCC	Nelson City Council
NPD	National Policy Direction for Pest Management
NPV	Net Present Value
NRC	Northland Regional Council
NWCCP	National Wilding Conifer Control Programme
ORC	Otago Regional Council
OSPRI	OSPRI (national TB vector control organisation)
PA	*Phytophthora agathidicida* (kauri dieback pathogen)
PCE	Parliamentary Commissioner for the Environment
PF	Predator Free

PFW	Predator Free Wellington
PV	Present Value
RMA	Resource Management Act 1991
RPMP	Regional Pest Management Plan
RTC	Residual Trap Catch
RUA	Regional and Unitary Authority
SOPI	Situation and Outlook for Primary Industries
SROI	Social Return on Investment
TB	Tuberculosis (bovine)
TBfree	TBfree NZ (national bovine TB management programme)
TDC	Tasman District Council
TDC	Tasman District Council
TEV	Total Economic Value
TRC	Taranaki Regional Council
TUK	Te Uru Kahika
WCRC	West Coast Regional Council
WRC	Waikato Regional Council

Executive summary

Regional councils and unitary authorities (RUAs) spend an estimated $142 million annually on managing biosecurity programmes across 13.2 million hectares of productive land. Te Uru Kahika engaged Heuser|Whittington to assess the economic value of regional biosecurity programmes delivered by New Zealand's regional and unitary authorities (RUAs). This report is written for RUAs, primary sector organisations, farming bodies and other industry stakeholders and central government policy makers engaged in RUA structural reforms. It provides an independent, evidence base for those organisations to engage in current discussions about local government functions and reform.

This report finds that the investment is strongly justified. Every quantitative cost-benefit analysis (CBA) conducted across 16 RUAs that provided one found positive net benefits. The best-evidenced programmes return $22 for every $1 invested over 10 years, rising to $128 per dollar over 50 years. The findings are relevant for upcoming central Government regional council and unitary authority reform ('Simplifying Local Government') and related policy areas such as rates capping and operational capability reviews.

Structural reforms to biosecurity responsibilities could disrupt existing biosecurity programmes. We find that a five-year disruption to biosecurity programmes (the most plausible scenario under structural reform) has an estimated net cost of $1.7 billion. That is approximately 12 times the annual programme budget notionally saved by stopping.

Overall benefits of biosecurity programmes

We reviewed 19 CBA documents from 16 RUAs, of which 15 are quantitative analyses. These use four different modelling frameworks. The finding of positive net benefits is consistent across all of them. Applying Treasury's current 2% discount rate to the two regions where detailed per-pest net present value (NPV) data permit harmonisation (Canterbury and Otago) produces a combined net present value of $2 billion. This represents what ratepayers in those two regions alone would forgo if programmes ceased. Across all responding RUAs, the conservative sector-wide estimate of annual avoided production losses is $285 million, approximately twice the annual programme budget.

Without suppression of pest populations, pest numbers rebuild along species-specific growth curves. Once populations re-establish and spread into new areas, the cost of regaining current control levels is substantially higher than the cost of maintaining them. This avoided escalation cost is the significant benefit that regional biosecurity provides. Without biosecurity programmes, a controlled problem would become an uncontrolled one.

The benefits of biosecurity investment are national but the funding is local/regional. Regional biosecurity programmes contribute to avoided production losses, avoided escalation costs and deliver biodiversity co-benefits. The 2025 Castalia report for TUK found that biosecurity programmes delivered at regional scale was the most appropriate approach for this function, but that the majority regional funding model did not always match the incidence of benefits (often national-scale). An independent review of regional council economic value (Sapere, December

2025) confirms that all programmes for which cost-benefit analysis has been completed show net benefits, and that the scale, coordination, and integration advantages of regional councils in biosecurity are not replicable through alternative delivery models. Biosecurity programmes are funded at a weighted average of 78% from RUA rates and council funding sources (the remainder is from central Government sources to support delivery of specific national pest programmes). Canterbury and Otago ratepayers fund $2 billion in net present value benefit (over a 100 year horizon), much of which accrues to national primary sector productivity and export market access. This structural mismatch is a design flaw that reform should fix, not deepen.

Biodiversity co-benefits from biosecurity investment

All 16 RUAs reported biodiversity co-benefits from biosecurity investment, with measurable or monitored evidence provided by 15. These include kiwi population recoveries, native canopy restoration, and lizard population rebounds. These co-benefits are not captured in benefit-cost ratio (BCR) calculations. Given these real and material co-benefits, our economic evaluation is therefore conservative.

Two case studies: Rooks and Chilean Needle Grass

To test the aggregate picture against specific programmes, we examined two case studies in depth:

- Rook eradication
- Chilean needle grass (CNG) control.

The case studies look at two different dimensions of regional biosecurity value and the value of regional delivery structures. Rook eradication demonstrates the benefit of investment that is coordinated between containment programmes (Canterbury, Marlborough and Hawke's Bay regions) and exclusion zones (Waikato, Horizons, Tasman and Southland regions). CNG control shows how coordination can prevent spread.

Together the two case studies validate the aggregate evidence. Regional biosecurity programmes provide sustained operational capability such as local knowledge, technical acumen, landowner relationships, and cross-tenure reach.

Rook eradication: the return on sustained coordination

Canterbury's rook population peaked at approximately 5,600 birds in the early 2000s. By 2023, Environment Canterbury (ECan) had achieved complete eradication. ECan is the only RUA to have done so through three decades of cross-tenure coordination. Hawke's Bay Regional Council (HBRC) has achieved an 81% reduction over 22 years. Horizons Regional Council (Horizons RC) achieved a 97% reduction. The HBRC rooks programme returns $22 for every $1 invested over 10 years, and $128 per dollar over 50 years.

However, Canterbury's eradication is contingent on continued control in the regions that still hold rook populations. If a remnant breeding population were left to expand, it could re-establish in Canterbury within years, undermining the investment that produced eradication.

Chilean needle grass: the cost of letting a sleeper weed spread

CNG is currently established across approximately 3,528[1] hectares in Canterbury, Marlborough, and Hawke's Bay. Bourdôt and Buddenhagen (2023) model a potential range of 3.96 million hectares of New Zealand pastureland (that is, in other regions beyond those three). Under a do-nothing scenario, national present-value production losses range from $192 million (slow spread) to $1.16 billion (fast spread). ECan's sustained control programme manages 525 hectares at a cost of approximately $230,000 to $290,000 per year. The investment is effectively an annual insurance premium to avoid a Canterbury-specific production exposure risk of hundreds of millions of dollars, and has benefits in regions beyond Canterbury that avoid infestation. CBA analysis confirms that sustained control is the only positive-value management option. Doing nothing and eradication are both negative-value at Canterbury's current infestation scale, and Marlborough and Hawke's Bay regions would have similar results.

Recommendations

We recommend that Te Uru Kahika uses the findings in this report to:

- Equip primary sector advocates with credible, citable evidence. The evidence in this report is consolidated, harmonised, and ready to use. The most powerful single framing: ratepayers pay 78% of a $142 million annual insurance premium to avoid a $1.7 billion loss.
- Commission Phase 2 next steps to evaluate delivery model options and build the co-investment case. This report establishes what regional biosecurity is worth. Phase 2 could assess how it should be delivered and funded under different reform outcomes. This could include evaluating which delivery models preserve the operational capability that underpins these results, and designing a co-investment framework that aligns funding with beneficiaries. Council Territories Board (CTB) legislation is expected mid-2026. Structural decisions about biosecurity delivery could be locked in by 2029. Phase 2 scope and budget should be agreed by end of 2026.
- Strengthen the sector-wide evidence base for ongoing use. A common CBA methodology across Regional Pest Management Plans (RPMPs), a shared national production loss dataset, and biodiversity co-benefit valuations for at least two or three well-evidenced programmes would substantially improve the quality of future analyses and strengthen the investment case over time.

[1] 3,528 ha is sum of three council-reported hectares. Bourdôt and Buddenhagen (2023) estimate 3,099 ha. for national invasion.

1. Introduction

Te Uru Kahika engaged Heuser|Whittington to assess the economic value of regional biosecurity programmes delivered by New Zealand's RUAs. The Government's November 2025 'Simplifying Local Government' proposals to restructure regional governance into CTBs, as well as broader local and regional government policy change (for example, rates capping) creates a need for this evidence base. The intended audience for this report is RUAs, primary sector organisations, farming bodies and other industry stakeholders and central government policy makers engaged in RUA structural reforms. If regional biosecurity functions are disrupted, reassigned, or funding reduced during the reform transition, the economic consequences could be large and difficult to reverse. Te Uru Kahika needs a credible, consolidated evidence base to inform the reform conversation and to equip advocates making the case for maintaining effective biosecurity delivery at the regional level.

Regional biosecurity programmes are delivered across 16 RUAs under the Biosecurity Act 1993 and National Policy Direction for Pest Management. Each RUA develops a Regional Pest Management Plan (RPMP) and funds pest control operations, surveillance, landowner coordination, and enforcement, primarily through general and targeted rates. Evidence of programme value exists in individual council CBAs, but these have been conducted at different times using different models, discount rates, and time horizons, making sector-wide comparison difficult and limiting their use as advocacy tools.

This report draws on data requests to all 16 RUAs, 16 cost-benefit analysis (CBA) documents provided by all RUAs, peer-reviewed research, and independent economic modelling. We harmonise council-level CBA results to current Treasury guidance, estimate the economic cost of a programme gap under reform scenarios, and examine the evidence in depth through two case studies: rook eradication and Chilean needle grass (CNG) control. The analysis covers economic benefits to the primary sector and, separately, biodiversity outcomes. Monetised biodiversity values are not included in the headline economic figures; their omission means the economic case presented in this report is conservative.

This report is structured as follows:

- Section 2 describes the scale and structure of regional biosecurity programmes across New Zealand's 16 RUAs
- Section 3 presents the economic evidence: existing council CBAs, harmonised analysis, the cost of a programme gap, and the funding mismatch between national beneficiaries and regional ratepayers
- Section 4 contains Case Study 1: Rook eradication. It examines the achievements of three decades of coordinated regional investment
- Section 5 contains Case Study 2: Chilean needle grass control. It examines the cost of CNG reaching its potential range and the value of sustained regional control
- Section 6 documents the biodiversity co-benefits delivered alongside economic pest management across all responding RUAs
- Section 7 sets out recommendations for Phase 2 of this work and the engagement with the central Government reform proposals.

2. Regional biosecurity protects primary production worth $34 bn per year

Regional councils and unitary authorities (RUAs) carry out biosecurity programmes that protect significant productive land and help avoid major production losses. The mechanism is direct. Active pest suppression by RUAs keeps pest populations below economically damaging thresholds. Without suppression, populations rebuild along exponential growth curves which increases livestock losses, crop damage, pasture degradation, and control costs. The case studies in Sections 4 (rooks) and 5 (Chilean needle grass) illustrate this in full.

2.1 RUAs manage biosecurity programmes across 13.2 million hectares of productive land

New Zealand's 16 RUAs are empowered under the Biosecurity Act 1993 to provide regional leadership in activities that prevent, reduce, or eliminate adverse effects from harmful organisms. The National Policy Direction for Pest Management (2015) guides how councils develop and implement RPMPs. These statutory functions sit alongside biodiversity responsibilities under the Resource Management Act 1991 (RMA), which mandates the protection of significant indigenous vegetation and the maintenance of biodiversity.

In practice, RUAs are the on-the-ground delivery arm of New Zealand's post-border biosecurity system. While central government agencies[2] set national strategy and manage border biosecurity, RUAs hold the operational capability within and between regions to manage pests at the regional and local level. This includes specific local ecological knowledge, detailed understanding of regional pests and ecosystems, and the relationships with landowners needed to implement pest management effectively.

Across the 16 responding councils, regional biosecurity programmes involve:

- Pest control operations: direct field operations targeting pest animals and pest plants through trapping, poisoning, biological control, and physical removal
- Surveillance and monitoring: tracking pest distribution, density, and spread to detect new incursions and measure programme effectiveness
- RPMP implementation (including enforcement) and landowner support: giving effect to RPMPs through landowner advice, guidance, and where necessary formal compliance enforcement action. Good Neighbour Rules require landowners to control pest spread onto neighbouring properties and RUAs support landowners to meet these obligations and escalate to enforcement where voluntary approaches are insufficient
- Landowner coordination and engagement: working with farmers, iwi, community groups, and agencies (DOC, MPI, Tb Free NZ) to coordinate effort across property boundaries

[2] MPI is the lead agency for biosecurity and national strategy and border management (via Biosecurity NZ). DOC is the lead agency for the national biodiversity strategy. MfE develops national environmental policy including the National Policy Statement on Indigenous Biodiversity. Environmental Protection Agency approved importation of new organisms. Customs supports monitoring of arrivals and facilitates cross-border movement of goods.

- Awareness, education and community engagement: informing and supporting landowners, communities, and industry on biosecurity obligations, RPMP rules, Good Neighbour Rule requirements, and emerging threats. Education is a primary delivery tool because voluntary compliance and early pest reporting reduces the need for formal enforcement
- Science and data: maintaining regional pest distribution databases, commissioning cost-benefit analyses to support RPMPs, and contributing to national pest management evidence.

RUAs manage over 1300 pest species (many of these will be duplicates across RUAs) over New Zealand's 13.2 million hectares of productive land[3] in their 16 Regional Pest Management Plans, employing approximately 346 FTE and spending $142 million per year on biosecurity operations. The table below sets out the scale of activity by council, and the funding sources (noting central government funding is for specific nationally-led programmes such as for wilding conifers and wallabies control).

Table 2.1: Regional biosecurity programme scale by council

RUA	Annual budget ($m)	FTE	Pests managed per RPMPs	Council funded (%)	Central govt (%) for specific programmes
NRC	15.4	45	143	70%	30%
Auckland Council	41.0	60	279	99.6%	0.4%
WRC	16.7	23	65	75%	25%
BOPRC	7.6	20.2	103	57%	43%
GDC	1.0	6	104	99%	1%
HBRC	3.6	10.7	63	96%	3.7%
TRC	5.5	11.5	19	98%	2%
Horizons RC	8.2	28.5	70	91.5%	8.5%
GWRC	13.2	74	46	75%	1%
NCC	0.3	2	98	95%	5%
TDC	0.4	4	98	90%	10%
MDC	4.5	6	35	45%	54%
WCRC	0.7	3	42	90%	10%
ECan	14.8	25	52	39%	61%
ORC	6.9	18	51	75%	25%
ES	2.5	9	73	59%	41%

[3] Stats NZ Agricultural Production Statistics, year to June 2023 (final), available at: https://www.stats.govt.nz/information-releases/agricultural-production-statistics-year-to-june-2023-final/)

SECTOR TOTAL	**142.4**	**345.9**	**1341**	**78% (weighted average)**	

Notes: Central government contributions relate to specific nationally-led programmes such as the National Wilding Conifer Control Programme (NWCCP) and the national wallaby management programme. These are not ongoing co-funding of RPMP delivery. Core RPMP delivery is predominantly rates-funded.
GWRC FTE (74) includes staff on the Key Native Ecosystem (KNE) programme (combined KNE budget: $1,813,789). Biosecurity-only FTE is not separately reported. The 25% non-council funding includes 1% confirmed MPI/DoC funding; the remaining 24% relates to Predator Free Wellington DOC funding that is pending confirmation.

Biosecurity programmes are funded primarily through general and targeted rates, with some central government co-funding to support regional delivery of specific national programmes. Across responding RUAs, a weighted average of 78% of biosecurity expenditure is funded from council rates and revenue, with the balance from central government grants, Tb Free NZ contributions, and other sources. The funding mix varies significantly by council. For example, Environment Canterbury (ECan) reports 61% from national programme funding, while others such as Gisborne District Council (GDC) are almost entirely rates- and council revenue-funded.

2.2 Pest damage would impose significant costs without biosecurity programmes

The value of regional biosecurity is measured against what would happen without it (counterfactual). If RUAs stopped coordinating pest management, pest populations would increase toward their ecological carrying capacity, spreading into areas currently kept clear through sustained control. In the counterfactual, individual landowners would continue some private pest control motivated by their own production losses, but without regional coordination, cost-sharing, or enforcement of so-called “good neighbour rules” (under Biosecurity Act where landowners are required to prevent pests from imposing costs on neighbours).

Council biosecurity managers across all 16 responding regions consistently described what would happen if their programmes were significantly reduced or stopped:

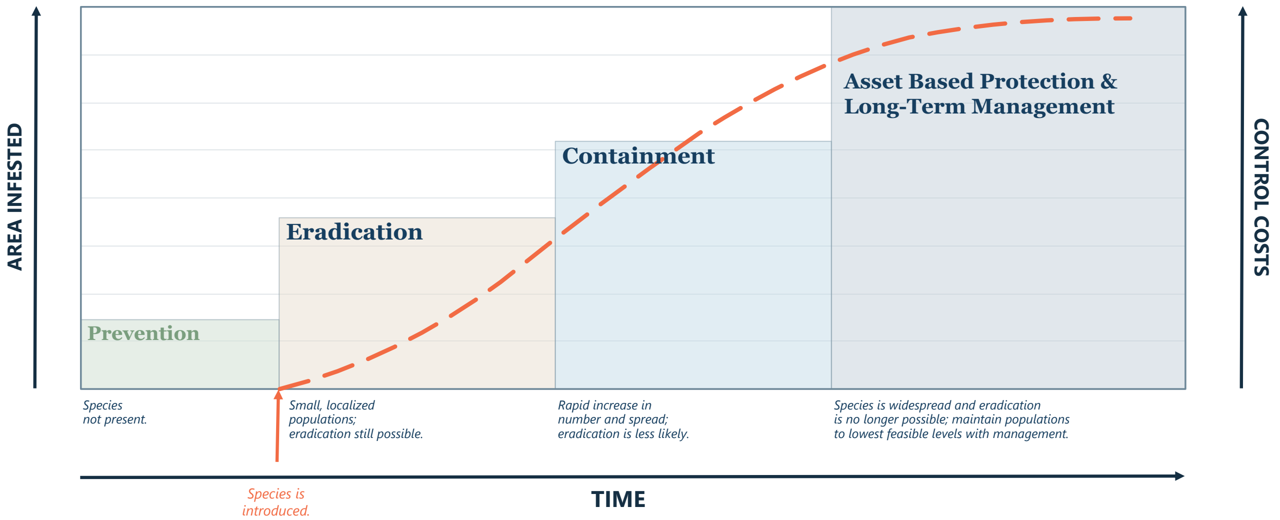
Pest populations would rebuild rapidly. Councils reported that pest animal and plant populations would increase at exponential rates in the absence of coordinated control. Species currently under management include possums, rabbits, rooks, and pest plants (management objectives vary by pest and council, from eradication to containment to sustained control, as set out in individual RPMPs and summarised in Table 3.1). These species would expand from residual populations back toward pre-control densities. GWRC noted that tuberculosis (TB) resurgence during the late 1980s and 1990s, after possum control effort ceased in 1978, provides a direct historical example of what happens when effort drops. WCRC notes that when funding was reduced in the late 1970s, TB surged and following re-intensification in possum control, 257 infected herds reduced to fewer than 50.

Production losses would escalate. Increased pest presence on productive land increases costs for primary producers through stock losses, crop damage, pasture degradation, and increased on-farm pest control expenditure. The councils that provided quantitative estimates indicated that:

- Possums reduce pastoral carrying capacity by 7% of a stock unit per possum per hectare[4], equivalent to approximately $2 per hectare per year in lost production.
- Rooks can devastate newly sown cereal crops, with Horizons RC estimating uncontrolled damage potential of $1.6 million per year from re-sowing costs across 8,000 hectares of cropland.
- Chilean needle grass displaces productive pasture grasses, reducing carrying capacity on affected properties by 25%.[5]
- Wilding conifers progressively displace productive pastoral land. Environment Southland (ES) has 660,000 hectares of highly vulnerable hill and high country land in its management area that would be at risk over 50 years without sustained control.

The cost of regaining control would exceed the cost of maintaining it. Several councils noted that the cost of re-establishing control after a gap in effort would be substantially higher than current programme costs.[6] Once pest populations rebuild and spread into new areas, the control task becomes larger and more expensive. This is the core economic argument: spending now avoids paying more later. The invasion curve (stylised) below illustrates this:

Figure 2: Invasion curve (stylised)



Source: Stylised representation based on Williams (1997) and Victorian Government (2010) "Invasive Plants and Animals Policy Framework"

Central government programmes would not fill the gap. MPI manages border biosecurity and leads national-scale responses to new incursions. DOC manages pests on the conservation estate.

[4] Greer, R.G. (2006), as cited in Horizons Regional Council, Costs and Benefits Supporting Document for RPMP 2016 (2015). One possum per hectare reduces the carrying capacity of land by 7.2% of a stock unit; estimated additional gross margin of $2.13 per hectare per year if possum-affected stock units were returned to sheep and beef farming.

[5] Bourdôt & Buddenhagen (2023), PLOS ONE.

[6] BOPRC estimated a cost of $2–3m for a 5-year gap; WCRC estimated the gap in low-single-digit millions; TRC supplied $82.5m–$123.75m specific 5-year gap estimate; GDC estimated a 3× multiplier for gap recovery.

TB Free NZ coordinates possum control for bovine TB management. None of these programmes replaces the regional coordination, landowner engagement, and RPMP enforcement that councils provide. The counterfactual holds central government effort constant and isolates the value of the regional contribution.

ES provided CBA data for velvetleaf, estimating a do-nothing cost of approximately $7.7 million per year in the region (dairy $6.9m; cereal and export tulip losses). The 2016 incursion response involved 4,500 ha, 287 properties, and $800,000-plus in emergency expenditure. This provides a real-world precedent for the escalation cost of delayed intervention. NCC provided a more recent example of what occurs when a programme stops. Following the de-listing of purple pampas grass and Argentine ants after 2019, both species began re-establishing in areas previously under active management. This is a direct observation of the counterfactual within the current RPMP cycle.

New Zealand's primary sector generates $34 billion[7] in GDP annually across dairy, sheep and beef, horticulture, forestry, and arable farming. The table below shows the primary land use sectors at risk by pest group if regional biosecurity programmes ceased, based on council cost-benefit analyses and the harmonised assumptions set out in Appendix A. The table illustrates the pest categories managed by regional biosecurity programmes and the primary sectors each affects. It is a non-exhaustive, illustrative summary (individual RPMPs set out region-specific pests):

Table 2.2: Example pest groups and primary land use sectors at risk if regional biosecurity programmes ceased

Impact scale: H = high (primary target, significant economic impact documented in CBA literature) M = medium (secondary or partial impact) L = low (incidental) — = negligible or not applicable

Pest group	Sheep & beef	Dairy	Horticulture	Plantation forestry	Arable & cropping	Native ecosystems & biodiversity
Rabbits and wallabies	H	L	L	M	M	M
Wilding conifers	H	—	—	L	—	H
Nassella tussock and Chilean needle grass	H	L	L	—	H	M
Broom and gorse (woody weeds)	H	L	L	M	L	M

[7] Ministry for Primary Industries, Situation and Outlook for Primary Industries, December 2023. The food and fibre sector directly contributed $34.4 billion (approximately 10% of GDP) in the year to 31 March 2022. Available at: https://www.mpi.govt.nz/dmsdocument/60526-Situation-and-Outlook-for-Primary-Industries-SOPI-December-2023

Ragwort and nodding thistle (toxic weeds)	H	H	L	—	M	L
Rooks	M	M	L	—	H	L
Possums	M	M	M	H	—	H
Kauri dieback (Phytophthora agathidicida)	—	—	—	—	—	H
Marine invasives (Caulerpa, Undaria)	—	—	—	—	—	H

Sources: Pests listed are illustrative examples, not an exhaustive or representative list of all pests in all regions. Council RPMP cost-benefit analyses harmonised to 2025 NZD. RUA RPMPs.
Note: Phytophthora agathidicida (PA, kauri dieback) is a soil-borne pathogen affecting native kauri forest and plantation operations where PA is present. Soil hygiene requirements apply to managed access routes and forestry operations. The primary impacts are on native timber, tourism, and forestry in Northland, Auckland, and Coromandel.

The table above represents the production base that is currently protected by regional biosecurity programmes. The actual loss under the counterfactual depends on pest spread rates, the degree of private control that would continue without regional coordination, and the time horizon considered. Section 3 of this report quantifies the net economic benefit after accounting for these factors.

3. Regional biosecurity investment delivers strong and consistent economic returns

Regional biosecurity programmes consistently deliver positive economic returns, and stopping them would cost far more than continuing.

We reviewed 19 CBA documents from 16 regional and unitary authorities. Every quantitative analysis of terrestrial pest management programmes found positive net benefits. We harmonised the Canterbury and Otago analyses to Treasury's current 2% discount rate, finding a combined net benefit of approximately $2.0 billion. We compared the current expenditure and programme results against the counterfactual of a five-year cessation scenario (Table 3.3). This counterfactual is at the disruptive end of a spectrum of possible reform outcomes. Other outcomes could be inadequate funding or disruption to the current suite of programmes and its workforce. These could be as damaging over time as stopping them, and more likely as reform proceeds.

Against the counterfactual of a five-year cessation, New Zealand would face estimated costs of $1.0 to $3.2 billion above the savings from stopping, driven by escalating pest damage and re-establishment costs. The benefits from biosecurity programmes flow broadly to primary producers, exporters, and communities across New Zealand, but the funding falls predominantly on regional ratepayers.\

3.1 Existing council CBAs consistently show positive net benefits

RUAs are required to demonstrate that the benefits of their pest management programmes outweigh the costs before they can impose rules on landowners. This requirement, under Section 71 of the Biosecurity Act 1993 and the National Policy Direction for Pest Management 2015, means that every council with a Regional Pest Management Plan has conducted cost-benefit analysis of its biosecurity programmes.

We reviewed 19 CBA documents provided by 16 councils. 15 of the 19 CBAs are quantitative analyses included in this report. The remaining documents are qualitative assessments or analyses excluded for methodological reasons (see Table 3.1 note). Every quantitative CBA that assessed terrestrial pest management programmes found positive net benefits: the value of avoided pest damage exceeds the cost of running the programme.

The CBAs were produced using four main analytical approaches:

- **Harris/LWP Plant Pest Spread Model (ECan, Otago Regional Council (ORC), ES).** Five CBAs using a detailed species-specific spread model over 100-year horizons at a 6% discount rate. This is the most rigorous and consistent body of evidence in the set, covering rabbits, wallabies, rooks, wilding conifers, Chilean needle grass, broom, gorse, and other pests in Canterbury, Otago, and Southland.
- **Wildlands/Lincoln University model (Taranaki Regional Council (TRC), GWRC).** Three CBAs using a modified Harris model with logistic growth curves, parameter ranges rather than point estimates, and both production and non-production values. Analysis periods of 10 to 50 years at 4% discount rates. All preferred management options showed positive net

benefits. Bay of Plenty's CBA is the most extensive in the dataset, covering more than 60 pest species across both models.`

- **AgResearch/AgPest model (GDC, Nelson City Council/Tasman District Council joint RPMP. MDC, HBRC).** Four CBAs using the AgPest model with NPV and IRR-based reporting over 10 to 50 year horizons at 4 to 7% discount rates. Marlborough reports IRRs of 11 to 15% across three pests. Hawke's Bay reports positive 50-year net benefits for eight of nine pests profiled, with 50-year NPVs ranging from $23 million (rooks) to $450 million (Chilean needle grass) at 4%. Internal rates of return exceed 100% for Gisborne's gorse and nodding thistle programmes, confirming investment viability independent of discount rate choice.
- **Other approaches (Sapere for ES, Auckland Council, Horizons RC, Northland Regional Council (NRC), WRC).** These include a Total Economic Value framework for wilding conifers (BCR of 14 to 20), an ecosystem services framework covering 279 managed species (Auckland), a Social Return on Investment approach (Horizons RC: $1.63 return per $1 invested[8]), and a cost-of-inaction analysis quantifying escalation risks from marine invasive algae (Northland, $40 to $98 million present value).

The consistency of the finding across different RUAs, different pests, and different analytical methods strengthens the conclusion. No council found that its overall pest management programme cost more than the benefit. However, three analyses present partial or conditional exceptions.[9]

Table 3.1: Summary of quantitative CBAs across councils

Council	Method & Year	Parameters (rate / horizon)	Key pests covered	Key result
GROUP 1 — Harris/LWP Plant Pest Spread Model | Environment Canterbury, ORC, Environment Southland				
Environment Canterbury	Harris/LWP & Associates (2017)	6% / 100 yr	Wilding conifers, nassella tussock, rabbits, broom, gorse, rooks. (6 pests)	Total NB $792m; risk-adj NB $366m At 2%/100yr (rediscounted): ~$1,013m [1]
Otago Regional Council	Harris/LWP & Associates (2018)	6% / 100 yr	Wilding conifers, broom, gorse, ragwort, rabbits, nodding thistle, bomarea (7 pests)	Reported NB $1,389m; risk-adj $609m At 2%/100yr (rediscounted)
Environment Southland	Harris/LWP & Associates (terrestrial, 2018)	6% / 100 yr	Multiple terrestrial pests (companion to ECan)	Positive net benefit
GROUP 2 — Wildlands/Lincoln University Model | Greater Wellington RC, Taranaki RC, BOPRC				

[8] Representing $14.33m in two-year benefits against $8.77m in costs; benefit decomposition: $8.1m stock and carbon, $5.45m native birds, $557k pest/bTB, $223k tourism.

[9] The ES marine CBA for Undaria shows a negative NPV when biodiversity values are excluded; the NDC Caulerpa study is a cost-of-inaction analysis rather than a programme CBA; and HBRC's urban privet programme shows a marginally negative net benefit ($2.7 million negative over 50 years at 4%), reflecting limited economic spread of urban privet as distinct from rural control. The HBRC feral cat and mustelid NPVs ($864 million each at 50 years, 4%) use identical area parameters and may reflect overlapping benefit estimates for predator control rather than independent values.

Council	Method & Year	Parameters (rate / horizon)	Key pests covered	Key result
Greater Wellington RC	Wildlands/Lincoln Agritech (2018)	Not reported	Possums and broader pest portfolio	Positive net benefit
Taranaki RC	Wildlands/Lincoln Agritech (2017)	Not reported	44 pest species (full regional programme)	Positive net benefit
BOPRC	Wildlands + AgResearch/AgPest	4% / 10-50 yr	60+ pest species incl. wallabies, feral goats, catfish, CNG, nassella, blackberry, wilding conifers	All programme pests positive NPV. Blackberry $43-262m. Lodgepole pine $39-140m.
GROUP 3 — AgResearch / AgPest Model | Gisborne DC, Nelson-Tasman, Marlborough DC, Hawke's Bay RC				
Gisborne DC	AgResearch / AgPest (2017)	Not reported / 10–30 yr	Gorse, nodding thistle	IRR >100% (both pests) (holds at any plausible discount rate)
Nelson / Tasman DCs	AgPest (2019)	Not reported	Broom, gorse, nassella tussock, boneseed	Positive NPV
Marlborough DC	AgResearch / AgPest (online tool, 2017)	4% / 50 yr	CNG, nassella tussock, kangaroo grass (3 pests; Med. fanworm qualitative)	CNG NPV $76m, IRR 15.1% Nassella NPV $43m, IRR 12.9% Kangaroo grass NPV $23m, IRR 11.2%
Hawke's Bay RC	HBRC internal / AgResearch (RPMP CBA, 2018)	4% / 10 yr & 50 yr	Rooks, CNG, possums, privet (urban), feral cats, carp, didymo, Argentine ants, fire ants (9 pests)	8/9 pests positive (50yr NB): • Feral cats $864m; CNG $450m • Rooks $228m; Possums $76m • Privet (urban): –$2.7m [4]
GROUP 4 — Other Approaches | ES Sapere, ES Marine, Auckland, Horizons, Northland, Wellington				
Environment Southland	Sapere — Total Economic Value (2026)	2% / 50 yr	Full biosecurity programme (wilding conifer focus)	BCR 14.4–20.2 (TEV); 5.4–6.7 (use value) Scale-back scenario: BCR negative (–7.3)
Environment Southland	Harris/LWP — marine (2015)	6% / 100 yr	Undaria pinnatifida (marine invasive algae)	Negative NPV (excl. biodiversity values) Positive when biodiversity included
Auckland Council	AC internal — ecosystem services (c.2017)	Not reported	279 managed species (full programme)	Positive net benefit
Horizons RC	Valueable Ltd — SROI (2025)	Not reported	Possum control programme	$1.63 per $1.00 invested (SROI)
Northland RC	NRC internal — cost of inaction (2024)	Not reported	Caulerpa brachypus and Caulerpa parvifolia (marine invasive algae)	Cost of inaction: $40m–$98m PV if management ceases
GWRC	WRC internal — programme CBA (c.2023)	Not reported	Possums, Caulerpa, broader pest portfolio	Positive net benefit confirmed

Notes: 16 councils responded. 15 provided quantitative CBA evidence; West Coast RC provided qualitative only. Full CBA profiles and assumption details are in Appendix B.

3.2 Harmonised analysis confirms consistent benefits of biosecurity programmes

We harmonised the CBA reports provided by 16 RUAs. ECan and ORC used a consistent analytical approach which enabled us to harmonise that analysis in-line with the Treasury's 2% recommended discount rate, finding a combined net benefit from biosecurity for those two RUAs of approximately $2 billion. The remaining RUAs (using four different analytical models and discount rates ranging from 4% to 8%) confirm that terrestrial biosecurity programmes yield net benefits. HBRC and MDC (two additional councils with full quantitative CBAs conducted at 4% discount rates) both report strongly positive returns consistent with the broader dataset.

ECan and ORC analysis confirms $2 billion in benefits

To illustrate the effect of applying current Treasury discount rates to existing council evidence, we rediscounted the detailed per-pest NPV results from the two councils with the most complete data: ECan and ORC. Both used the Harris/LWP Plant Pest Spread Model at 6% over 100 years. We applied annuity factor ratios to approximate the results at 2% (Treasury base) and 8% (mandatory sensitivity).[10]

Under these harmonised assumptions, the combined net economic benefit from biosecurity programmes in Canterbury and Otago alone is approximately $2 billion (at 2%) or $585 million (at 8%). These two councils represent approximately $22 million of the sector's $142 million annual biosecurity budget, or about 15%.

The harmonised assumptions follow current NZ Treasury guidance and are set out in full in Appendix A:

- **Discount rate:** 2% real for years 1-30, declining to 1.5% for years 31-100, per Treasury Circular 2024/15 (October 2024). This is the prescribed rate for non-commercial public sector cost-benefit analysis. A mandatory sensitivity test at 8% is also reported. For context, the council CBAs reviewed in section 3.1 used rates of 4-8%, with 6% being the most common.
- **Time horizon:** 20 years as the base case, with an extended 50-year analysis where long-run pest dynamics are material.
- **Counterfactual:** Full cessation of regional biosecurity programmes. Central government programmes (MPI border biosecurity, Tb Free NZ, DOC conservation management)

[10] This approach provides an approximation rather than a full re-estimation. It assumes that the original 6 % NPV can be represented by an equivalent constant annual flow over the time period, and then rescales that flow using annuity factor ratios. That will be reasonable where costs and benefits are broadly smooth through time, but it can misstate the effect of alternative discount rates where the underlying cashflows are materially front-loaded, back-loaded, or otherwise uneven. In those cases, accurate rediscounting would require the original annual cashflow streams rather than the reported NPV alone.

continue unchanged. Individual landowners continue some private pest control but without regional coordination, cost-sharing, or enforcement.

- **Benefit categories:** Avoided production losses and avoided escalation costs form the headline estimate. Water quality and yield benefits are included where quantified. Biodiversity and amenity benefits are reported separately and are not included in the headline figure.

Table 3.2 Harmonised net benefits at Treasury discount rates (ECan and ORC)

Council	Pest	Value Used at 6% ($m)	NB at 2% ($m)	NB at 8% ($m)
ECan	Wilding Conifers	$5.3	$13.8	$4.0
ECan	Nassella Tussock	$136.2	$353.2	$102.4
ECan	Broom	$13.9	$36.1	$10.5
ECan	Gorse	$10.6	$27.5	$8.0
ECan	Rabbits	$3.1	$8.0	$2.3
ECan	Rooks	$0.1	$0.4	$0.1
ORC	Wilding Conifers	$226.0	$586.1	$169.9
ORC	Broom (Rural)	$59.3	$153.8	$44.6
ORC	Gorse (Rural)	$59.3	$153.8	$44.6
ORC	Ragwort	$76.5	$198.4	$57.5
ORC	Rabbits	$158.0	$409.8	$118.8
ORC	Nodding Thistle	$1.6	$4.1	$1.2
ORC	Bomarea	$27.9	$72.4	$21.0
TOTAL (ECan + ORC)		**$777.9**	**$2,017.5**	**$584.9**

Other RUAs' CBAs confirm net benefits of terrestrial biosecurity programmes

The finding of benefits is consistent across all 16 councils. Four different analytical models and discount rates ranging from 4% to 8% show that no council found stopping terrestrial biosecurity cheaper than continuing it.

The other RUAs that provided CBAs do not report per-pest NPV figures (unlike ECan and ORC) in a form that can be mechanically rediscounted. However, every quantitative CBA reviewed (Table 3.1) found that the benefits of terrestrial pest management exceeded the costs at discount rates of 4-8%. Since the Treasury's current prescribed rate of 2% is lower than any rate used in those analyses, the existing positive findings are strengthened, not weakened, by applying current guidance.

3.3 Stopping regional biosecurity would cost substantially more than continuing it

Without suppression of pest populations, pest numbers rebuild along species-specific growth curves. Once populations re-establish and spread into new areas, the cost of regaining current control levels is substantially higher than the cost of maintaining them. This avoided escalation cost is the significant benefit that regional biosecurity provides. Without biosecurity programmes, a controlled problem would become an uncontrolled one.

The evidence for this the value of regional biosecurity programmes comes from three sources:

Council spread models show rapid pest rebuilding. The Harris/LWP Plant Pest Spread Model, used in the Canterbury, Otago, and Southland RPMP cost-benefit analyses, projects pest population growth under a "do nothing" scenario using logistic density curves calibrated to each species. For plant pests such as wilding conifers, the models show progressive spread from current infestations into adjacent productive land over 20-50 years. For animal pests such as rabbits, population recovery to pre-control densities can occur rapidly after programme cessation.

Sapere (2026) quantified the escalation cost for wilding conifers in Southland. This is the most recent and methodologically sophisticated cost-benefit analysis in the set. Sapere compared three levels of investment against a "status quo" counterfactual where the programme scales back to managing only one of nine management units. The results show benefit-cost ratios of 14.4 to 20.2 (total economic value) or 5.4 to 6.7 (use value only, excluding cultural and biodiversity benefits) for the three investment scenarios. At the maximum investment level, the total economic NPV is $2.45 billion over 50 years; scaling back to the status quo implies $1.41 billion in foregone benefit relative to that option. Under the status quo (scaling back), the BCR is negative (minus 7.3): costs exceed benefits because the remaining programme is too small to prevent spread, so the money is spent without achieving containment. Sapere also flags Douglas fir as the next wave of wilding conifer invasion. Without early intervention, control costs for Takitimu alone are projected to escalate 8–10 times current levels as the species establishes. The message is clear: partial investment that fails to contain spread is worse than either full investment or complete withdrawal. Current levels of regional investment are delivering returns of $14 to $20 for every additional dollar invested.

Historical experience confirms the pattern. Greater Wellington reported that possum control effort was reduced during the late 1980s and early 1990s, leading to TB resurgence that required significantly more expensive re-control. West Coast reported a similar experience after possum control funding was removed in the late 1970s. Taranaki estimated the cost of regaining current control levels at $82 to $124 million if programmes ceased. Several councils noted in their data request responses that the cost of regaining current control levels after a five-year gap would be "substantially higher" than current annual programme costs.

Illustrative escalation costs without continued investment

The benefits from biosecurity programmes (that is, avoiding escalation costs) is important in the context of potential regional government reforms. If regional biosecurity functions are restructured in a way that creates a gap in programme delivery, the cost of rebuilding capability and re-suppressing pest populations will probably exceed the savings from any restructuring. Pests do not wait for institutional reform to be completed. This is true even for temporary suspensions of biosecurity programmes, or even temporary reductions in funding or workforce disruption.

To illustrate the order of magnitude of the costs involved, we modelled a stylised scenario in which all regional biosecurity programmes stop for five years and then restart. The model uses conservative assumptions grounded in the evidence reviewed above. Under the central case, the net cost of a five-year gap (production losses plus re-establishment costs, minus programme savings) significantly exceeds the savings from stopping. Even under the low case, the net cost is substantial.

Table 3.3: Illustrative escalation costs: maintaining control vs regaining control

Metric	Low ($m)	Central ($m)	High ($m)
Programme savings from stopping (5 years)	$670.2	$670.2	$670.2
Cumulative production losses during gap	$1,227.5	$1,807.5	$3,300.2
Re-establishment cost to regain control	$402.1	$522.8	$603.2
Net cost of the gap	$959.4	$1,660.0	$3,233.2

Source: Illustrative estimates based on Harris/LWP spread modelling and Sapere (2026) wilding conifer analysis.

3.4 Biosecurity benefits are widely shared but funded on a predominantly regional basis

Regional biosecurity protects primary production and biodiversity across New Zealand. The benefits flow to farmers, exporters, communities, central government, and the environment. But the funding comes predominantly from regional ratepayers. As set out in section 2, 78% of biosecurity programme funding comes from council rates and regional revenue, with the remainder from central government co-funding, TB Free NZ contributions, and other sources.

Central government contributes to regional biosecurity through several funding mechanisms. MPI provides funding for specific national programmes including the National Wilding Conifer Control Programme. TB Free NZ co-funds possum control in areas where bovine TB management overlaps with regional pest management. DOC contributes to site-led programmes on conservation land. These contributions are important and are acknowledged in the sector-wide analysis.

Auckland Council's kauri dieback programme illustrates the mismatch between regional and national funding clearly. Auckland's cost allocation analysis identifies $1,994,000 per year attributed to kauri dieback management. It is the largest single pest-specific programme cost we analysed after ECan and MDC wilding conifer and CNG programmes. Kauri is a nationally significant species and its loss would be irreversible. The programme cost falls almost entirely on Auckland ratepayers despite the national value of the ecosystem being protected.

The core regional biosecurity function (coordinated surveillance, sustained control, enforcement of RPMP rules, and landowner engagement) is funded almost entirely from regional rates. If this funding were removed or reduced through reform, the central government programmes that remain would not replicate the regional coordination function.

This matters for the reform conversation in two ways:

- **Benefits are national but the costs are regional.** Regional ratepayers fund programmes that protect national primary production, maintain export market access, and deliver biodiversity outcomes that benefit all New Zealanders. The median council funds 90% of its biosecurity programme from rates. Increased central government co-investment in these programmes is probably justified, particularly given the national interest in primary sector productivity and biosecurity resilience.

- **Any reform that reduces regional funding for biosecurity without replacing it will reduce programme delivery.** The economic analysis in sections 3.1 to 3.3 shows that regional biosecurity programmes deliver substantial positive net benefits. Reducing funding does not save money in the long run. It shifts costs from planned programme expenditure to unplanned pest damage.

4. Case study 1: Rook eradication success

Rooks have historically been a major pest and caused significant crop losses. Rook control cannot be achieved by individual landowner action because the birds spread when disturbed. Canterbury has achieved eradication of rooks, ahead of ECan's target date, with other regions significantly reducing rook populations. Eradication of rooks from New Zealand depends on continued coordinated RUA action.

4.1 Rooks cause $105 to $790 per hectare in crop losses and cannot be suppressed by individual landowners

Rooks (Corvus frugilegus) are colonial birds that feed in large flocks on germinating crops, pasture, and horticulture. HBRC modelling estimates current impacts of $105 to $790 per hectare per year on horticultural land[11] and $55 to $267 per hectare per year on dairy farmland.[12] A newly sown crop can be stripped in days by a feeding flock.

Individual farmer response fails because of how rooks respond to disturbance. Shooting breaks up roosting groups: birds disperse and establish new colonies on neighbouring properties. Population reduction requires simultaneous nest-targeting with slow-acting toxins during the breeding season, applied across the entire area of infestation. Individual landowners cannot do this, and a single council acting without cross-boundary partners cannot achieve it either. The problem is structurally regional.

4.2 Regional councils have invested $577,000 per year in coordinated rook eradication

Eleven RUAs operate rook programmes. Eight run active eradication or suppression campaigns.[13] Three maintain exclusion zones at the fringe of established rook range. Canterbury is now complete. Gisborne has eliminated a recent incursion. The remaining seven programmes are active.

Table 4.1: Regional rook programme summary—11 RUAs

RUA	Programme type	Annual cost ($/yr)	Current status
Active eradication or suppression			
ECan	Eradication (complete)	Nil	Eradicated May 2023 — first pest animal eradication in Canterbury, 5 years ahead of RPMP target
HBRC	Eradication	$133,924	Active — 198 nests (2025/26); RPMP target: eradication by 2038
Horizons	Eradication	$190,000	Active — 79 nests (2025/26)

[11] HBRC RPMP CBA 2018–2038
[12] HBRC RPMP CBA 2018–2038
[13] Auckland Council runs a passive (zero budget) exclusion programme.

GWRC	Eradication	$137,751*	Active
WRC	Eradication	$54,000	Active — <30 birds
ORC	Eradication	$10,000	Active — ~10 birds
GDC	Eradication (rapid response)	~$20,000	Population eliminated
BoPRC	Surveillance only	$2,462	Near zero — no active breeding colonies; surveillance only
Total — active eradication councils		**$548,137**	
Exclusion zone			
MDC	Exclusion	$26,000	3 incursions detected and eliminated; no established population
ES	Exclusion / surveillance	$2,500	Zero detections since 2019
Tasman/Nelson	Exclusion	—	Exclusion zone maintained

*Note: * GWRC rook cost ($137,751) is a direct operational line supplied as a late supplement by GWRC Pest Animals team; it is not drawn from a formal CBA. Other GWRC programme data carry similar caveats as flagged by GWRC in their data response*

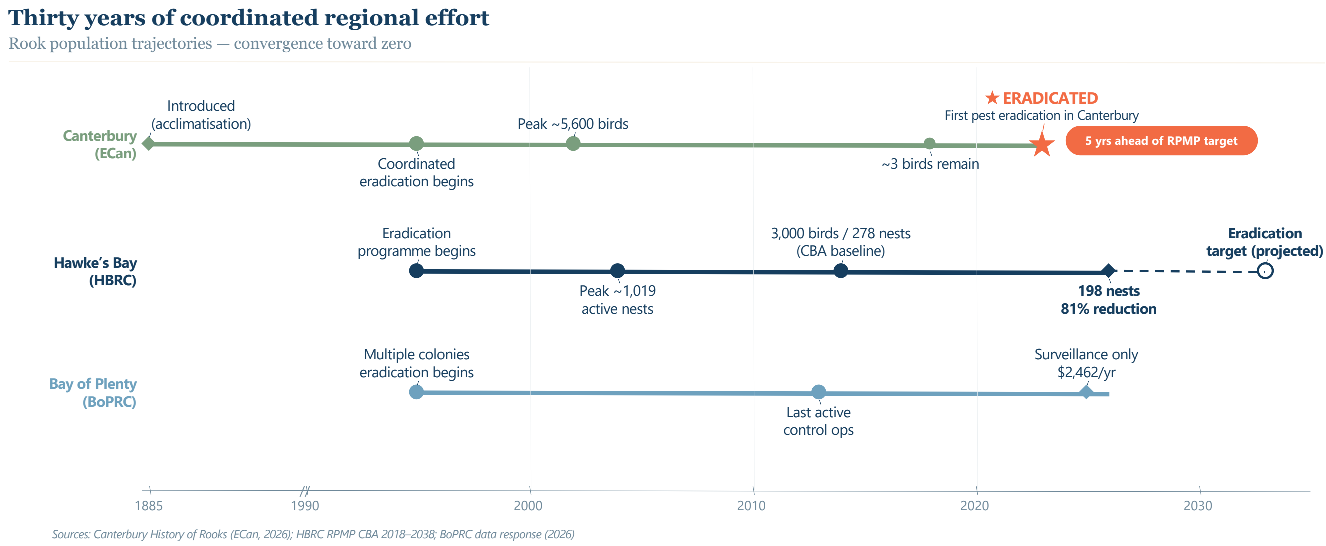
Annual eradication expenditure across the nine councils with active or recently active eradication programmes totals approximately $548,000.[14] This excludes Canterbury, where eradication is complete and maintenance costs are near zero, and the three exclusion-zone councils (Marlborough DC, Environment Southland (ES), Tasman/Nelson), whose combined annual exclusion spend is around $29,000.

4.3 Canterbury eradicated its entire rook population in 2023; other regions report sustained declines of 80% to 97%

Every region that has tracked rook population numbers shows sustained decline. Canterbury has eradicated its rook population, and other RUAs have made significant progress, as Figure 4.1 illustrates:

[14] Derived from council data request responses to Heuser|Whittington in March 2026

Figure 4.1 - Rook population trajectories by region



Sources: Council data request responses 2026; HBRC RPMP CBA 2018–2038; ECan RPMP records; Horizons RC programme data.

The region-by-region evidence is notable:

- Canterbury's population peaked at approximately 5,600 birds in the early 2000s,[15] concentrated in Banks Peninsula, Selwyn, and Timaru, the heart of Canterbury's arable cropping districts. Thirty years of coordinated control progressively reduced the population. In May 2023, the last known rook was shot near Parnassus,[16] completing what ECan confirmed as the first eradication of a pest animal species in the region, five years ahead of the 2028 target in the Canterbury Regional Pest Management Plan.[17]
- Horizons RC began active eradication with 2,942 active nests across its programme area.[18] The current count is 79 nests, a 97% reduction.[19]
- Hawke's Bay peaked at 1,019 active nests in 2003/04.[20] The 2025/26 count is 198 active nests, an 81% reduction over 22 years.[21] The programme targets eradication under the HBRC RPMP 2018 to 2038.
- Waikato Regional Council (WRC) recorded approximately 450 birds before its programme began. The current count is fewer than 30 birds, a reduction of more than 93%.[22]
- ORC has reduced its population from approximately 50 birds to 10, an 80% reduction.[23] The programme continues.

[15] ECan RPMP records
[16] ECan data response to Heuser|Whittington March 2026
[17] ECan RPMP 2018; ECan data response 2026
[18] Horizons RC data request response to Heuser|Whittington March 2026
[19] Horizons RC data request response to Heuser|Whittington March 2026
[20] HBRC data request response to Heuser|Whittington March 2026
[21] HBRC data request response to Heuser|Whittington March 2026
[22] WRC data request response to Heuser|Whittington March 2026
[23] ORC data request response to Heuser|Whittington March 2026

- GDC responded to a nine-bird incursion with rapid targeted control and eliminated the population.[24]
- Bay of Plenty's multiple small breeding colonies were eliminated more than a decade ago. Bay of Plenty now spends $2,462 per year on passive surveillance,[25] responding to occasional unconfirmed sightings.
- Marlborough District Council (MDC) operates an exclusion programme at the boundary of rooks' established range. Three incursion events have been detected and eliminated.[26] No established population exists in Marlborough.
- ES has recorded zero rook detections since 2019 under its exclusion and surveillance programme.[27]

4.4 Each dollar of RUA expenditure avoids $22 to $128 in pest impacts

The Hawke's Bay CBA is the most fully modelled analysis available. Under a no intervention scenario, rooks would impose $37.1 million in pest impacts over 10 years (NPV at 4%), rising to $244.2 million over 50 years.[28] Against that counterfactual, 10-year programme costs total $1.1 million NPV and net benefit is $23.7 million, returning $22 for each dollar of council expenditure. Over 50 years, programme costs total $1.8 million NPV and net benefit reaches $227.7 million, returning $128 for each dollar of council expenditure. The 50-year range across sensitivity scenarios runs from $7.5 million to $1.24 billion.

Horizons RC estimated the cost of inaction at $1.6 million per year across its programme area, based on direct re-sowing costs across 8,000 hectares of cropland.[29] This is not a formal discounted CBA, but it is directionally consistent with the HBRC analysis.

Canterbury's eradication CBA (Harris/LWP, 2017) was written when only one to three birds remained in the region; net benefit at 6% is $142,049, rediscounting to approximately $368,000 at 2%.[30] The HBRC analysis is the appropriate proxy for what a full active eradication programme delivers: Canterbury's situation 20 years ago is similar to Hawke's Bay today.

Table 4.2: CBA results for HBDC, ECan and Horizons

Study	Timeframe	Discount rate	Council cost (NPV, $)	Net benefit (NPV, $)	BCR
HBRC — active eradication	10 years	4%	$1,058,094	$23,684,127	**22:1**

[24] GDC response to Heuser|Whittington March 2026
[25] BOPRC response to Heuser|Whittington March 2026
[26] Marlborough DC response to Heuser|Whittington March 2026
[27] Environment Southland response to Heuser|Whittington March 2026
[28] HBRC RPMP CBA 2018–2038
[29] Horizons RC data request response to Heuser|Whittington March 2026
[30] LWP/Harris CBA for ECan 2017; rediscounted using annuity factor ratio

HBRC — active eradication	50 years	4%	$1,779,139	$227,736,371	**128:1**
ECan — post-eradication (tail end) *	*100 years*	*2%**		*$368,479*	*n/a*
Horizons — cost-of-inaction estimate **	*Annual*	—		*$1.6m/yr avoided (estimated)*	*n/a*

*Notes: * ECan CBA (Harris/LWP 2017) written when 1–3 birds remained; net benefit rediscounted from 6% to 2% using annuity factor ratio. Not comparable to active programme CBAs. ** Horizons estimate of crop re-sowing cost avoidance across 8,000 ha/yr. Not a discounted CBA; directionally consistent with HBRC analysis.*

4.5 Eradication depends on continued control in the regions that still have rooks

Rooks are mobile. A remnant breeding population in other regions, left to expand, could re-establish in Canterbury within years. Canterbury's eradication is not self-sustaining because it is only one node in a network of eleven coordinated regional programmes. HBRC’s documentation states this directly: all regions in the North Island with rooks have active management programmes, with eradication from New Zealand as the aim.[31]

The value of Canterbury's eradication is conditional on active programmes continuing in HBRC, Horizons, WRC, ORC, GWRC, and BoPRC, and on the exclusion network holding in MDC, ES, and Tasman/Nelson. This interdependence is especially acute for ORC given the long common boundary with Canterbury. Rooks historically ranged across regions and a rebuilding population in one region would threaten the eradicated zone in a neighbouring region within a single breeding season. These eleven programmes effectively form a single coordinated national campaign. The campaign is funded primarily from regional rates and depends on institutional structures that allow regional councils to coordinate across boundaries.

Reform of regional government functions could disrupt this network. The rooks case study demonstrates what regional coordination can achieve over decades of sustained investment. The achievement becomes fragile if the governance arrangements that produced it change.

[31] HBRC RPMP CBA 2018–2038

5. Case study 2: Chilean needle grass; stopping the spread

Chilean needle grass (CNG) is being contained in several regions in New Zealand. It imposes significant losses to pastoral productivity, which would be significantly higher if allowed to spread. Several RUA programmes contain its spread with positive benefit-cost ratios.

5.1 Chilean needle grass is a pastoral weed with a large and growing footprint of potential harm

CNG (Nassella neesiana) is a perennial tufted grass, originating from South America, that forms dense clumps displacing productive pasture species. During its summer seeding period, stock must be excluded from infested paddocks, reducing farm earnings by an estimated 25% on affected land according to 2015 analysis.[32] The sharp penetrating seeds bore into the eyes, skin and pelts of grazing animals such as lambs, causing blindness, welfare harm, and downgrading of wool, hides and carcasses.[33]

The invasion is currently concentrated in three regions: Canterbury (525 ha across approximately 30 properties (2026 actual; 325 ha at 17 sites was the 2017 CBA baseline)), Marlborough (2,804 ha, 268 properties), and Hawke's Bay (199 ha). The total national area of CNG management is 3,528 ha and the council data identifies 6,817 landowners across 2 million hectares of land at risk nationally.[34] The climatically suitable pastureland for CNG in New Zealand is 3.96 million hectares.[35] The current occupation is less than 0.08% of the total potential range. Despite this relatively small infestation, the potential for economic losses to productive farming is significant.

Table 5.1: CNG invasion status by region

RUA	Programme type	Infested area (ha)	Potential range at risk (ha)	Management objective	Annual cost ($/yr)
Core infestation regions					
ECan	Sustained control	525	790,257	Sustained control (RPMP)	$260,000
MDC	Sustained control	2,804	136,012	Containment (RPMP)	$390,000
HBRC	Sustained control	199	397,578	Sustained control (RPMP)	$125,134
Total — core infestation councils		**3,528**			**$775,134**
Exclusion-boundary regions					

[32] Bourdôt & Buddenhagen (2023), PLOS ONE
[33] Southland RPMP (2019–2029)
[34] Bourdôt and Buddenhagen (2023) estimated the national total area as 3,099 ha, but their survey pre-dates the latest council data.
[35] Bourdôt & Buddenhagen (2023)

Horizons	Exclusion	—	—	Exclusion	$19,000
TDC	Exclusion	—	—	Exclusion	$5,500
WRC	Exclusion / surveillance	—	—	Exclusion	$2,940
ES	Exclusion	—	—	Exclusion	$2,500
Total: exclusion-boundary councils		**—**	**—**		**$29,940**
Grand total: 7 councils (MDC cost excluded: see **)		**3,528**			**$805,074**

*Notes: **National infestation: PLOS ONE (2024) reports 3,099 ha. Council-reported sum (ECan 525 + MDC 2,804 + HBRC 199) = 3,528 ha. We use 3,099 ha for national invasion claims; use 3,528 ha for the councils' combined managed area.*

Canterbury has the largest area of climatically susceptible pastureland of any region (790,257 ha), making it the RUA with greatest economic exposure. ECan has a Sustained Control objective. Hawke's Bay (397,578 ha susceptible) manages CNG under a Sustained Control (eradication) objective. Marlborough manages under Containment.

5.2 CNG spread modelling shows losses of $192 million to $1.16 billion if control ceases

Bourdôt and Buddenhagen (2023) model two national invasion scenarios using a logistic spread model calibrated to observed Marlborough data (1987–2005). Under the slower spread scenario (time to 90% occupation: 201 years), the national present value of production losses at a 3% discount rate is $192.4 million.[36] Under the faster scenario (100 years to 90% occupation, consistent with a warmer and wetter future climate), national losses reach $1.16 billion.[37]

Table 5.2: National and regional do-nothing PV costs under slow and fast spread scenarios

Spread scenario	Years to 90% occupation	National ($)	Canterbury ($)	Hawke's Bay ($)	Marlborough ($)
Slow spread (base case)	201	$192,400,000	$22,800,000	$16,900,000	$22,800,000
Fast spread (climate change scenario)	100	$1,160,100,000	$159,000,000	$112,800,000	$53,500,000

Source: Bourdôt & Buddenhagen (2023) PLOS ONE. Slow spread T90=201 years based on observed Marlborough spread 1987–2005 (18→96 farms). Fast spread T90=100 years reflects climate-change scenario. Canterbury exposure figures exclude biodiversity impacts (ECan CBA notes additional 3,500 ha of native grassland at risk within 100 years).

The Canterbury exposure is particularly acute. The region has 790,257 ha of potentially invadable pastureland but currently 525 ha managed across approximately 30 properties. Under the fast-spread scenario, Canterbury alone faces $159 million in avoided production losses. Hawke's Bay

36 Bourdôt & Buddenhagen (2023), PLOS ONE
37 Bourdôt & Buddenhagen (2023), PLOS ONE

faces $113 million. These figures exclude biodiversity impacts. ECan's CBA separately notes that a further 3,500 ha of native grassland would be at risk from spread within 100 years if Canterbury's programme ceased.[38]

The spread model also highlights a key feature of CNG biology. Despite limited natural dispersal capacity (seeds cluster at the parent plant base), farm-to-farm movement via livestock, hay, and machinery has historically driven exponential spread. The number of infested Marlborough farms grew from 18 in 1987 to 96 by 2005.[39] Sustained control in Marlborough arrested that spread but did not reverse it.

5.3 Three regional councils run active programmes; annual programme costs range from $145,000 to $750,000

ECan manages 525 ha across approximately 30 properties under its Sustained Control objective. The programme has grown from the 2017 CBA baseline of 325 ha across 17 active sites. Annual council programme costs are estimated at $230,000–$290,000 (100% rates-funded). The 2017 LWP CBA modelled an annual programme cost of $145,000, with the present value of costs split between $700,000 for landholder control obligations and $2,000,000 for council inspection and monitoring (both NPV at 6%).[40]

MDC has a 2,804 ha infestation, with modelled programme costs of approximately $750,000 per year under a Sustained Control scenario.[41] HBRC manages an estimated 850 ha across 314 properties under a Sustained Control objective, contributing $25,000 to a joint AgResearch weed seeds trial alongside seven other councils. Annual programme cost is $125,134 (FY 2024/25, 100% council rates-funded), including a Pest Plant Incentive Scheme component under which HBRC subsidises 50% of on-property control costs (the total real-world spend including landholder contributions is approximately $168,000).

5.4 Cost-benefit analysis confirms sustained control is the only positive-value management option in Canterbury; doing nothing costs $7 million in foregone production

The ECan RPMP CBA (LWP, 2017) evaluates four options for Canterbury's 325 ha infestation at a 6% discount rate. The Do Nothing scenario results in $7 million in total control costs and lost production (PV). ECan's selected Sustained Control option produces a net benefit NPV of $3.61 million ($1.17 million risk-adjusted). All other active management options (Progressive Containment and Eradication) produce negative net present values under base case assumptions, primarily because their higher programme costs exceed the additional production benefits achieved relative to Sustained Control.

Table 5.3: CBA results for Canterbury and Marlborough

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[38] LWP CBA for ECan (2017)
[39] AgResearch CBA 2017 (MDC)
[40] LWP CBA for ECan (2017)
[41] AgResearch CBA 2017 (MDC). Note: modelled scenario cost, not confirmed actual

Study	Management option	Area scope	Discount rate	PV programme cost ($)	Net benefit NPV ($)	BCR
LWP CBA 2017 — Canterbury (325 ha, 2017 baseline; 6% discount rate)						
LWP CBA 2017	Do Nothing	Canterbury (325 ha)	6%	$7,000,000	—	—
LWP CBA 2017	Sustained Control	Canterbury (325 ha)	6%	$3,000,000	$3,610,000	2.2:1
LWP CBA 2017	Progressive Containment	Canterbury (325 ha)	6%	$11,000,000	($3,780,000)	0.7:1
LWP CBA 2017	Eradication	Canterbury (325 ha)	6%	$13,000,000	($5,800,000)	0.6:1
AgResearch CBA 2017 — Marlborough/Canterbury combined (2,804 ha; 4% discount rate)						
AgResearch CBA 2017	Do Nothing	Marlborough/Canterbury	4%	—	($32,148,391)	—
AgResearch CBA 2017	Sustained Control	Marlborough/Canterbury	4%	—	$16,526,703	—*

*Note: BCR = total benefits / programme costs (benefits = PV costs + net NPV). * AgResearch BCR not calculable: programme costs not separately quantified in published CBA. The two CBAs are not directly comparable (different base areas, geographies, and discount rates). LWP risk-adjusted NPVs: Sustained Control $1.17m; Progressive Containment −$5.25m; Eradication −$5.76m.*

The Marlborough/Canterbury analysis confirms the direction of these findings at larger scale. Under the Do Nothing scenario, the present value of production losses reaches $32.1 million at 4%.[42] Sustained Control at $750,000 per year returns a net NPV of $16.5 million (IRR: 10.9%), delivering roughly one dollar of net benefit for every dollar invested in programme costs.[43]

Sensitivity testing in the ECan CBA (Table 82) shows the Sustained Control conclusion is robust to variations in the cost of control, production impact estimates, and time to full occupation.[44] The conclusion is sensitive to two conditions: a very slow rate of spread (50% of base) and a high discount rate (8%). In both cases, the Do Nothing option becomes preferred, however neither condition reflects that with climate change more pastureland becomes suitable for CNG and Treasury now prescribes 2% as the base rate for non-commercial CBAs.[45]

5.5 Continued regional investment avoids major pastoral losses

The CNG case study demonstrates the value of acting before an invasive pest catastrophe materialises. At present, the annual cost of ECan's programme is $230,000 to $290,000 ($440 to

[42] AgResearch CBA 2017 (MDC)
[43] AgResearch CBA 2017 (MDC)
[44] LWP CBA for ECan (2017)
[45] Bourdôt & Buddenhagen (2023) note the spread estimates are conservative because they exclude a projected 60% expansion in climatically suitable land by 2080; Treasury Circular 2024/15 (October 2024) prescribes 2% real as the base rate for non-commercial public-sector CBA.

$550 per infested hectare per year) which protects 790,257 ha of Canterbury pastureland from invasion, or less than 40 cents per hectare of susceptible land.

Expressed as an insurance premium, $230,000 to $290,000 per year is being paid to avoid a Canterbury-specific exposure of between $22.8 million (slow spread) and $159 million (fast spread) in present value terms. Even at the upper end of programme costs, the present value of avoided losses in Canterbury alone is nearly 80 times the annual programme cost under the slow-spread scenario, and more than 500 times under fast spread.

CNG also demonstrates the coordination problem that makes regional biosecurity a public good. Natural spread of CNG is limited; the historical driver of farm-to-farm spread in Marlborough was livestock movement and hay contamination. Containing this vector requires surveillance across multiple properties, movement control enforcement, and inspection of high-risk pathways. These activities cannot be effectively delivered property by property. Instead, they require a regional authority with statutory powers and cross-boundary coordination capacity.

The reform risk for CNG is not equivalent to rooks. Canterbury has not eradicated CNG; the programme is actively maintaining a frontier against further spread, which also avoids spread to other regions. Any reduction in regional biosecurity capacity (such as surveillance budget, inspection staffing, or movement control enforcement) creates a direct risk that the invasion expands beyond the 525 ha currently under management.

6. Biosecurity programmes deliver biodiversity outcomes

Biosecurity and biodiversity outcomes are closely linked in practice, though they are often discussed as separate programmes. Regional biosecurity programmes generate significant biodiversity outcomes as a co-benefit of protecting primary production. This occurs through the same field operations, relationships, and institutional capability that underpin pest management. These co-benefits arise from both pest animal and pest plant control. Control of invasive plants protects native ecosystems by preventing displacement of indigenous vegetation. Control of invasive predators reduces predation pressure on native fauna. All 16 responding RUAs confirmed that biosecurity programmes deliver biodiversity outcomes alongside economic benefits.

6.1 Pest plant control as a biodiversity intervention

Control of invasive plants such as wilding conifers, environmental weeds, sleeper weeds, and invasive aquatic and marine plants protects native ecosystems by preventing displacement of indigenous vegetation and avoiding long-term ecosystem transformation.

Pest plant control frequently delivers preventative biodiversity outcomes. Early intervention stops invasive plants from establishing dominance in native grasslands, wetlands, forests, braided river systems, and marine environments, preserving ecosystem structure and function before restoration becomes technically difficult or prohibitively expensive. Evidence from responding RUAs shows that pest plant biosecurity:

- Protects indigenous plant communities and rare ecosystems (e.g. dryland and native grasslands);
- Maintains habitat quality for native fauna by retaining native vegetation structure;
- Restores native ecosystems following large-scale weed or wilding removal; and
- Prevents slow-burn biodiversity losses that are often not immediately visible but are highly consequential over time.

Wilding conifer programmes provide the clearest example. Investment justified primarily on biosecurity and production grounds simultaneously restores sub-alpine and tussock ecosystems. Recent evidence from Southland (Sapere 2026) found that 63–70% of the total economic value of the wilding conifer programme is non-use, cultural, and biodiversity value (with Māori cultural values are explicitly noted as unmonetized). These outcomes are delivered through core biosecurity operations, not through separate biodiversity programmes. Furthermore, wilding conifer removal in Tasman restores sub-alpine native ecosystems and productive pastoral land simultaneously.

Other pest plant programmes show similar patterns across the dataset:

- Invasive grass control (including CNG) protects native dryland grasslands from displacement by exotic pasture species, preserving habitat structure for native invertebrates and lizards.

- Woody weed control of broom, gorse, and old man's beard across Nelson, Marlborough, and Canterbury removes competition from regenerating native shrubland and forest, enabling succession toward indigenous vegetation cover.
- Wetland weed management (purple loosestrife, parrot's feather, and reed species) maintains wetland ecosystem function and habitat quality for native waterfowl and invertebrates.
- Marine and aquatic invasive species management such as fanworm eradication in Nelson Haven and aquatic algae and weed programmes in northern harbours protects coastal and freshwater ecosystems from structural transformation by invasive species.

6.2 Pest animal control reduces predation and browsing pressure on native species and ecosystems

Pest animal control such as trapping, aerial poisoning, weed removal, and targeted herbicide application reduces population pressure on native ecosystems, and reduced pressure allows ecological recovery. Lower pest density leads to reduced browsing or predation which promotes vegetation and faunal response. The relationship is strongest for possum control in native forest, predator management in island and mainland island contexts, and invasive weed removal at native bush margins.

Strong evidence for biodiversity responses from multiple RUAs

Reducing invasive species, predators and invasive weed populations removes the principal drivers of native species decline in lowland and montane ecosystems. Where councils monitor for it, biodiversity response follows:

- HRC reports kiwi numbers at monitored sites rising from 209 to 405 birds between 2009 and 2023, and whio (blue duck) pairs increasing from 15 to 50–55 pairs, both directly associated with sustained pest control at Kia Wharite and Waimarino Forest.[46]
- NRC's HVA (High Value Area) and Mid/Far North partnership programmes include "Backyard Kiwi" where bird numbers increased from 80 to ~1,500 and pests trapped increased from 55,523 to 67,410
- Auckland Council reports a 370% increase in kōkako breeding pairs in Kohukohunui / Hunua Ranges Regional Park between 2014 and 2022, linked to its landscape-scale predator management programme.
- GWRC's monitoring at Baring Head showed a concurrent decline in hedgehog tracking and increase in lizard tracking, subsequently confirmed by pitfall trapping.

[46] Horizons RC monetised biodiversity co-benefits within its programme evaluation: the PCO SROI framework attributes $5.45 million of the $14.33 million two-year benefit total to native bird outcomes. This provides a proof-of-concept for the biodiversity valuation approach recommended in Section 7.

Possum control has direct biodiversity benefits

RUAs confirmed that possum control reduces browsing pressure on native vegetation and predation on native birds and eggs. This is well-documented in the ecological literature and confirmed by council field observations:

- GDC recorded a Browse Magnitude Index reduction from 62% to 10% across 4,274 hectares in the Upper Waimata catchment following intensive possum control.
- MDC attributes the abundance of mistletoes on D'Urville Island directly to the absence of possums under a long-running island exclusion programme.
- WCRC's Predator Free Te Kinga programme removed the breeding possum population from 4,000 hectares of Mt Te Kinga, with biodiversity response tracking confirming improved native forest condition alongside sustained low possum densities.
- TRC recorded a possum Residual Trap Catch rate increase from approximately 6% to over 10% over five years at Taranaki Mounga following a reduction in possum control effort. This is a direct measure of population resurgence when control eases.

Biodiversity co-benefits of biosecurity programmes

Single programmes deliver both a primary production benefit and a biodiversity outcome from the same field operation. For example:

- Marlborough's braided river habitats are critical breeding and feeding grounds for several endemic and endangered bird species. These are protected by the same regional pest management programmes that support pastoral production. MDC states that the majority of the region's 60 endemic species would be at risk if biosecurity programmes ceased, with populations in the Molesworth area facing "almost guaranteed loss."
- Wilding conifer removal in Tasman restores sub-alpine native ecosystems and productive pastoral land simultaneously.

Consistent evidence of biodiversity benefits

Across the full dataset, four councils provide quantified outcomes with direct attribution, five report monitored trends, and six confirm pest control activity with biodiversity co-benefit potential but have not provided outcome metrics through this process. We have graded the responses and quantification approaches with confidence levels in Appendix E. Table 6.1 sets out the council-by-council picture.

Joint protection is a consistent theme. A single pest management operation typically delivers both an agricultural and an ecological outcome. Programme costs in council RPMPs and CBAs (discussed in sections 2-5 above) are largely attributed to production protection. Biodiversity co-benefits accrue largely uncosted with the notable exception of Horizons RC, where the PCO programme SROI framework monetised $5.45 million in native bird benefits from a two-year programme period. The Sapere (2026) TEV analysis for Southland quantifies that 63-70% of the TEV of the wilding conifer programme is non-use, cultural, and biodiversity value (excluding Māori cultural values). Production-use values alone materially understate the full benefit of regional biosecurity investment. This means the economic case for regional biosecurity investment presented in section 3 of this report (above) is conservative.

Table 6.1: Biodiversity programmes and outcomes at RUAs

RUA	Programme delivering biodiversity outcome	Species or ecosystem benefiting	Monitoring method	Key metric or outcome
ECan	Wilding conifer containment; rabbit and weed control	Native tussock grassland; wetlands	Aerial and ground surveillance	Reduced encroachment on native ecosystems; recovery of native grassland cover where wilding conifer removed. Note: ECan does not undertake ecological monitoring linked to biosecurity outcomes (biodiversity benefits are inferred from pest containment results)
NRC	6 High Value Area (HVA) programme (~152,500 ha combined): Kiwi Link, Whangarei Heads, Tutukaka, Piroa-Brynderwyn, Mid North, and Waipoua; predator and pest mammal control ($800k/yr HVA investment)	North Island brown kiwi; mustelids, cats, and possums (prey base reduction); native biodiversity at HVA sites	Annual trap catch monitoring across all HVAs; kiwi population monitoring (Backyard Kiwi programme, Whangarei Heads)	Annual pest removals: 55,523 (2022–23) → 83,648 (2023–24) → 67,410 (2024–25). Mustelid removals: 1,662 → 2,140 → 2,188 (programme expansion reflected in rising catches); Backyard Kiwi (Whangarei Heads) population increasing
HBRC	Rook eradication; possum control; weed management (old man's beard, Darwin's barberry)	Native birds; native forest, shrubland, and bush margin habitats; riparian habitat	Pest population monitoring; rook population counts	Reduced browsing and predation pressure on native vegetation; co-benefits from rook decline (reduced disturbance to bush margins and riparian areas). No quantified ecological trend data yet
MDC	Possum exclusion: D'Urville Island and Marlborough Sounds islands (DOC partnership); landscape pest management across Molesworth and South Marlborough	Mistletoes (D'Urville); 60 endemic species at regional risk; braided river bird habitat; gecko/skink; threatened plants	Largely observational; DOC island monitoring for island programmes	Mistletoe abundance on D'Urville directly attributed to possum absence; majority of 60 endemic species would be at risk if programmes ceased; Molesworth species described as 'almost guaranteed loss'
GWRC	Key Native Ecosystem (KNE) programme; predator/pest control at Baring Head and Wellington city forests	Lizards (Baring Head / East Harbour RP); native birds (Wainuiomata, Pukaha, Predator Free Wellington)	National 8km grid monitoring; bird counts; tracking tunnels + pitfall trapping at Baring Head	Hedgehog tracking declined concurrently with lizard tracking increase; relationship confirmed by pitfall trapping study
Horizons	Intensive predator/pest control: Te Apiti, Totara Reserve, Kia Wharite, Waimarino Forest; whiō programme (Manganui-o-te-ao and Retaruke Rivers)	North Island brown kiwi; whiō (blue duck); powelliphanta	DOC/Horizons population monitoring; river surveys	Kiwi: 209 birds (2009) → 405 birds (2023). Whiō: 15 pairs (programme start) → 50–55 pairs; population target met
WRC	Pest control at DOC Ecological Management Units and priority biodiversity sites	Native species at priority sites (species not named in response)	No ecological monitoring reported	Programme overlap with biodiversity sites confirmed; no direct outcome evidence provided

BoPRC	Pest plant and animal control across catchments; multiple terrestrial, marine, and freshwater programmes	Riparian and coastal native vegetation; freshwater ecosystems	Catchment monitoring; LakeSPI (submerged plant indicator analysis)	Biodiversity co-benefits documented alongside catchment restoration outcomes; freshwater monitoring linked to core biodiversity programme, not RPMP; no RPMP-attributed biodiversity metric
GDC	Possum control: Upper Waimata Catchment Group (4,274 ha)	Remnant and secondary native forest ecosystems	Browse Magnitude Index (BMI) — vegetation transects	BMI reduced from 62% to 10% across 4,274 ha following intensive possum control
TRC	Predator Free Taranaki programme; Key Native Ecosystem pest control	Native birds; native vegetation — Taranaki Mounga	Annual bird counts; 5-yearly vegetation condition assessments; possum RTC monitoring	During active programme, possum RTC (Residual Trap Catch) maintained at ~6%. When programme intensity reduced, RTC increased to >10% over 5 years as possum work reduced, which is a quantified resurgence measure demonstrating effectiveness
TDC	Wilding pine and gorse/broom control; site-led pest mammal trapping (Waimea Estuary, Abel Tasman NP)	Native birds; native forest and shrubland; sub-alpine ecosystems; wetlands	Baseline biodiversity surveys (ongoing); community group monitoring	No trend data yet; baseline surveys underway; DOC partnership at Abel Tasman (6 pest plants)
NCC	Mediterranean fanworm eradication (Nelson Haven); multiple pest plant/mammal/marine programmes; Kotahitanga mō te Taiao Alliance	Mediterranean fanworm; regenerating native forest; marine, freshwater and terrestrial ecosystems	Site surveys (fanworm); bird count and vegetation monitoring at Alliance sites	Fanworm: 30 known sites (2013–14) → 0 since 2022–23. Confirmed eradications: cape tulip, phragmites, koi carp, water hyacinth, entire marshwort, Senegal tea
WCRC	Predator Free Te Kinga (4,000 ha eradication + 7,000 ha buffer); OSPRI TB vector control; community Predator Free initiatives	Native forest — lowland podocarp, beech, mixed forest; wetlands	Biodiversity response tracking alongside pest reduction monitoring (WCRC + DOC); OSPRI monitoring	Breeding possum population removed from 4,000 ha; 7,000 ha buffer maintained; forest condition improvement confirmed
ES	Wilding conifer control (Southland high country and hill country); marine biosecurity: Fiordland Marine Regional Pathway Management Plan; wetland pest plant control (purple loosestrife, parrot's feather); coastal boxthorn control	Sub-alpine tussock grassland and native grassland (wilding conifer); Fiordland marine biodiversity; wetland and coastal native species	Wilding conifer aerial and ground surveillance; Sapere (2026) Total Economic Value analysis; DOC/Fiordland Marine Guardians monitoring	Sapere (2026) TEV analysis finds 63–70% of the total economic value of ES's wilding conifer programme is non-use, cultural, and biodiversity value — biodiversity outcomes are the majority benefit (Māori cultural values additionally noted as unmonetised). Marine: tripartite partnership (ES, DOC, MPI, Fiordland Marine Guardians) active
ORC	Predator control: Possum Free Peninsula / Otago Peninsula Biodiversity Group; rabbit and weed control	Braided river habitats; native tussock grassland; dryland ecosystems; lizards and birds (Otago Peninsula)	Pest population and vegetation monitoring	Reduced grazing pressure on native tussock; wilding conifer containment protects native grassland. Biodiversity benefits described as 'assumed to occur where pest management occurs'; no formal attribution monitoring in place

Auckland	Sustained pest control — Hūnua Ranges (Kohukohunui); kauri dieback management — Hūnua and Waitākere Ranges; co-funder of Te Korowai o Waiheke stoat eradication (Waiheke Island)	Kōkako and karearea (Hūnua Ranges); kauri (Hūnua and Waitākere Ranges); kākā and native birds (Waiheke, Te Korowai o Waiheke programme)	Kōkako breeding pair counts; kauri pathogen surveillance; 2025 State of the Environment report; Hūnua Ranges kauri population health monitoring (2023)	Hūnua: kōkako breeding pairs increased from 55 (2014) to 259 (2022), a 370% increase attributable to mammalian pest management. Hūnua: kauri dieback pathogen confirmed absent. Waitākere: kauri dieback pathogen distribution mapped; spread actively managed. Waiheke (Te Korowai o Waiheke, co-funded by Auckland): 300% increase in kākā abundance post-stoat eradication

6.3 Strong case for integrated biosecurity and biodiversity at the regional level

Maintaining biosecurity functions at regional level is justified at a structural level. Across the RUAs that responded to our data request, biosecurity operations and biodiversity monitoring are delivered by the same field staff, through the same property access agreements, using the same regional surveillance networks. Biosecurity and biodiversity programmes are delivered through single integrated operations that produce multiple outcomes simultaneously.

The evidence is clearest where councils operate formal DOC partnerships. WCRC's programmes at Te Kinga and the wider Westland extension involve joint council–DOC field teams working across over 11,000 hectares of mixed tenure land. TRC's Taranaki Mounga programme has possum control and biodiversity monitoring as a single operation, with return-to-capture data and native species population data collected from the same sites by the same staff. GWRC's Baring Head restoration programme combines targeted predator control with lizard population monitoring. Biodiversity outcomes are not separate projects, they are direct products of the pest control operations.

HRC's programme illustrates the efficiency argument well. The kiwi and whio population monitoring increased native species numbers (209 to 405 kiwi, 15 to 50–55 whio pairs) and is conducted at the same locations and through the same field presence as the pest control programme. There is one set of relationships with landowners and DOC, one monitoring network, and one regional team. Disaggregating the biosecurity function from the biodiversity function would require either duplicating that infrastructure under a different agency or abandoning the biodiversity monitoring that currently runs alongside it at low marginal cost.

The CNG and rook case studies also illustrate the biosecurity-biodiversity link. Canterbury's rook eradication involved coordinated operations across private farmland, DOC land, and Crown pastoral leases. The RUA was the only entity with the cross-tenure relationships, the regional coordination mandate, and the sustained presence needed to carry that programme through to eradication. A central government agency without those relationships could not have replicated the result at comparable cost.

Reducing scope or funding for biosecurity programmes would negatively impact the biodiversity outcomes documented in Table 6.1. The institutional capability that produces those outcomes (such as, regional presence, landowner trust, integrated field operations) would be at risk. The biosecurity and biodiversity cases for maintaining regional functions are therefore the same case. Castalia (2025) found that biosecurity and biodiversity functions are most efficiently and effectively delivered at a regional scale, therefore changing the delivery model without careful consideration could jeopardise the biodiversity outcomes evidenced here.

7. Recommendations for Phase 2 and the reform conversation

This report arrives at an important time. The government's November 2025 proposal to replace elected regional councils with Combined Territories Boards (CTBs) and related local government policy changes such as rates capping raises questions about which functions should remain at the regional tier and how they should be funded. The economic evidence in this report relates directly to both questions. We make three recommendations:

- Use the report findings in education and advocacy on the value of biosecurity programmes
- Influence the delivery model option design and investment programmes
- Strengthen the evidence base

7.1 Use these findings to equip primary sector advocates with credible evidence

This report confirms that regional biosecurity programmes deliver substantial benefits against the rates-funded costs. However, the evidence is contained in different RUA CBA documents using at least four different methodologies. Advocates making the case for biosecurity investment have lacked a single, consistent set of numbers. This report provides those numbers. The most defensible and most useful messages for primary sector advocacy are:

- Regional biosecurity programmes collectively protect an estimated $285 million in annual primary production from pest damage. This is a conservative figure derived from existing council CBAs.
- A five-year cessation of programmes (the most plausible disruption scenario under structural reform) would cost an estimated $1.7 billion in escalating damage and re-establishment costs. That is approximately 12 times the annual programme budget notionally saved by stopping.
- The best-evidenced programmes return $22 for every $1 invested over 10 years (HBRC rooks) and up to $128 per dollar over 50 years. These are specific, auditable figures from transparent CBAs.
- For Canterbury and Otago alone, the harmonised net benefit at Treasury's 2% discount rate is $2 billion. This represents what ratepayers in those two regions would forgo if programmes ceased.

Advocates using these figures should be clear about three caveats. The BCRs cited above are from the best-documented programmes; the sector-wide average is lower, at approximately 2:1. The gap cost is model-derived, and depends on escalation rate assumptions that vary by pest type. The harmonised net benefit figure covers two regions only.

The most powerful single advocacy point is what would happen without regional biosecurity programmes (the counterfactual). Regional biosecurity is insurance against a much larger loss.

Ratepayers pay a weighted average 78% of an annual $142 million insurance premium to avoid a $1.7 billion insurance claim.

7.2 Potential Phase 2: delivery model options and investment case

This report establishes what regional biosecurity programmes are worth. It does not address how they should be delivered or funded under reform. The Government's reform agenda for regional councils makes those questions important. Te Uru Kahika has institutional support for reviewing the biosecurity functions of RUAs. Notably the Parliamentary Commissioner for the Environment explicitly listed biosecurity as a critical function that must remain at regional/catchment scale, and recommended pausing reform until a comprehensive review of which functions must be delivered at regional versus central level is completed.[47]

Te Uru Kahika's next steps (Phase 2) should address three things this report deliberately leaves open:

- Evaluate delivery model options under reform scenarios
- Build on the findings in Castalia (2025) and this report to determine an optimal co-investment framework for central and regional government funding in biosecurity
- Develop an implementation roadmap with reform-aligned milestones
- Collect a similar evidence base for the value of biodiversity functions.

Evaluate delivery model options under reform scenarios

The Government's regional government reform proposals introduce genuine uncertainty about what entity will hold biosecurity functions after reorganisation. The Castalia Report (2025) on functional allocation commissioned by TUK found that managing established pests should be delivered through a regional structure: "*either via RUAs or some other regional delivery model.*" Phase 2 should make that assessment operational:

- What specific delivery models preserve the operational capability that underpins the results documented in this report?:
    - Landowner relationships?
    - Surveillance networks
    - Cross-tenure coordination?
- Which reform scenarios preserve institutional characteristics, and which put them at risk?

This report sets out evidence that institutional settings matter. For example, Canterbury's rook eradication succeeded because one entity had cross-tenure relationships, a 30-year mandate, and sustained presence.

[47] Parliamentary Commissioner for the Environment, Submission on the Simplifying Local Government: A draft proposal consultation document, 20 February 2026, available at: https://pce.parliament.nz/media/fkqhu2gk/pce-submission-on-simplifying-local-government-a-draft-proposal-consultation-document.pdf

Design a co-investment framework

The Castalia report (2025) found a structural fiscal mismatch between the national benefits from regional biosecurity and regional rates funding of biosecurity programmes. Section 3.4 of this report confirms and quantifies that finding. Canterbury and Otago ratepayers fund a significant portion of the $2 billion in net present value benefit, much of which accrues to national primary sector productivity and export market access. Phase 2 could design a co-investment model that aligns funding with beneficiaries, and assesses what level of central government contribution is warranted and through what mechanism. Mechanisms could include programme grants, a national biosecurity levy, expanded MPI co-funding agreements, or a hybrid.

A co-investment framework should distinguish between programmes where benefits are genuinely local/regional and where the beneficiary base is national. Auckland's kauri dieback programme ($1,994,000/year) is a clear candidate because the programme protects a species of national significance using a mix of general rates, targeted rates, and charges with no direct central government contribution. Velvetleaf in Southland (ES cost-benefit data: $7.7m/year do-nothing cost) follows the same pattern. Phase 2 should map each major programme against its beneficiary geography to identify where co-investment mechanisms would most efficiently close the funding gap.

Develop an implementation roadmap with reform-aligned milestones

Council territorial board (CTB) legislation is expected to be introduced mid-2026 and enacted in 2027. Reorganisation plans will need to be completed within two years of CTB establishment, meaning structural decisions about biosecurity delivery could be locked in by 2029. Phase 2 needs to be completed in time to inform those decisions. A scope, timeline, and budget for Phase 2 should be agreed with TUK by mid-2027.

Collect a similar evidence base for the value of biodiversity functions

Section 6 above documents that all 16 responding RUAs reported biodiversity co-benefits, with measurable or monitored outcomes across 15 of them. However, those outcomes are not currently monetised in any systematic way. The approach used in this report (structured data request, evidence synthesis, and economic quantification) could be applied to biodiversity functions directly. The methodology would need to be carefully developed because there is no statutory CBA requirement that has produced a consistent cross-council dataset to draw on, and attribution of biodiversity outcomes to specific management activities is harder to establish. Nevertheless, a foundation exists because several RUAs already undertake quantified population monitoring, and benefit transfer methods can extend those results across councils that lack formal attribution data. A focused exercise drawing on three or four councils with strong monitoring evidence, combined with existing non-use value estimates such as the Sapere TEV analysis for wilding conifers, could produce a credible sector-wide biodiversity investment case without requiring original ecological research at every council. A parallel workstream to standardise what biodiversity outcomes RUAs report and how would strengthen both the immediate analysis and the sector's longer-term evidence base.

7.3 Strengthen the sector-wide evidence base for future use

The evidence gathered for this report exposes three systematic gaps that, if addressed, would substantially improve the quality of future analyses and the resilience of the investment case. Te Uru Kahika could consider the following additions to the evidence base for future use:

Standardise CBA methodology across RPMPs

19 CBA documents were reviewed across 16 RUAs, using four different models, discount rates from 4 to 8%, and time horizons from 10 to 100 years. Direct comparisons required manual harmonisation. The TUK biomanagers working group is already progressing a project to align RPMP methodological approaches. A common CBA methodology that is independently verified (minimum standards for discount rate, time horizon, benefit categories, and reporting format, agreed between TUK and MPI) would allow future analyses to be updated without reconstruction from first principles. The Biosecurity Act Amendment Bill, anticipated for introduction in 2026, provides a near-term vehicle to embed this requirement in the National Policy Direction for Pest Management.

Build a national production loss dataset

The analysis in Section 3 estimates production at risk using programme-level BCRs, because disaggregated data linking specific pest programmes to specific production losses by land use type does not exist in a consistent national form. The underlying data exists within councils. It is embedded in CBA working papers and RPMP supporting documents. However, it is not synthesised. A parallel TUK-commissioned review of RUA economic value (Sapere, December 2025) reaches the same conclusion: data collection is the primary barrier to establishing a complete picture of RUA value, and dedicated evaluation capacity within councils is the prerequisite for progress. A shared data platform, potentially hosted by MPI, would enable annual updates, cross-regional comparisons, and more granular modelling of the kind Table 2.2 attempted in this report.

Cost the biodiversity co-benefits

Section 6 documents biodiversity co-benefits reported by all 16 responding RUAs, with measurable outcomes across 15: monitored kiwi population recoveries, native canopy restoration, lizard population rebounds. None of these are included in the BCR calculations used in this report. The economic case for regional biosecurity is therefore conservative. Phase 2 could commission a biodiversity co-benefit valuation for at least two or three best-evidenced programmes: Horizons possum control, Auckland predator management, and GWRC Baring Head restoration are natural candidates. Ecological services that step from biodiversity improvements (reduced flooding, erosion mitigation, carbon sequestration) also provide value to the productive sector that could be quantified and valued. This would complete the investment case and directly support advocacy on the full economic value of maintaining programmes through the reform period.

Appendix A: Methodology and analytical assumptions

This report takes CBAs conducted by RUAs that were conducted at different times, using different discount rates and time horizons. To make results comparable and align them with current Treasury guidance, we applied a harmonisation methodology.

Discount rates and time horizons

New Zealand Treasury guidance (circular 2024/15) recommends a base discount rate of 2% for non-commercial CBAs in years 1-30 and 1.5% for years 31-100. The CBAs provided by RUAs to us (primarily the Harris/LWP analyses for Canterbury and Otago) used 6% over 100 years. A sensitivity test was applied at 8%, in-line with Treasury's mandatory sensitivity requirement.

Harmonisation method

Where CBAs used a consistent methodology (Canterbury and Otago), we converted net present values from the original discount rate to Treasury's current rate using the annuity factor ratio method. This method is exact for uniform annual benefit streams and produces a conservative (understated) result for benefit streams that grow over time, as pest spread typically does. The full harmonisation calculations are in Appendix B.

Production loss multiplier

Annual avoided production losses are estimated using a conservative average benefit-cost ratio of 2:1 derived from the Harris/LWP CBAs at 6%: for every $1 of annual programme expenditure, approximately $2 of annual production loss is avoided. Individual programmes vary considerably — the HBRC rooks programme achieves 22:1 at 10 years; sector-wide the average is closer to 2:1.

Escalation model (cost of a programme gap)

The gap cost analysis estimates what would happen if all RUA biosecurity programmes ceased for five years. Three components are modelled: (1) programme savings of $711 million (five years of avoided expenditure); (2) production losses during the gap, as pest populations grow at an estimated 15% per year (central scenario; 10% low, 25% high), compounding to a total of approximately 13.5 times the annual programme budget; and (3) re-establishment costs, estimated at 1.5 times the normal annual budget for three years (intensive catchup phase) plus a further two years at normal budget levels to consolidate restored control (ie, 6.5 times the annual budget in total ($925 million)).

Confidence tiers

Economic and biodiversity evidence is graded on a three-tier scale. Confidence A: quantified estimates with direct attribution. Confidence B: monitored trends with plausible attribution. Confidence C: directional evidence with unquantified relationship.

Funding attribution and data quality

Programme budgets are drawn from council data requests completed March–April 2026. The weighted average council funding share is 78%; the remainder is central government co-funding (MPI, NWCCP, DOC). One data quality note: West Coast Regional Council's budget includes an estimated salary component ($345,000, based on $100,000 per FTE × 3 FTE). All other council figures are sourced from confirmed data responses.

Appendix B: CBA harmonisation comparison table

Table B.1 summarises the 15 quantitative CBA documents (of the 19 reviewed), drawn from 14 of the 16 RUAs. Table B.2 shows the harmonisation calculations for the Canterbury and Otago Harris/LWP CBAs, converting original net present values at 6%/100 years to Treasury's current 2% discount rate and an 8% sensitivity rate.

Table B.1: Summary of quantitative CBA documents reviewed

Council	CBA author / model	Date	Discount rate	Time horizon	Key pests covered	Key quantitative result	Notes
Environment Canterbury	Harris/LWP & Associates	2017	6%	100 yr	Wilding conifers, nassella tussock, rabbits, broom, gorse, rooks (6 pests)	Total NB $792m (7 pests) • Wilding conifers: $561m • Nassella tussock: $160m • Rabbits: $41m • Broom: $14m; Gorse: $11m	Risk-adjusted NB: $366m. Rediscounted at 2%/100yr: ~$1,013m combined. See sheet 2-CBA NPV & Rediscount.
Otago Regional Council	Harris/LWP & Associates	2018	6%	100 yr	Wilding conifers, broom, gorse, ragwort, rabbits, nodding thistle, bomarea (7 pests)	Reported NB $1,389m (6 pests) • Broom: $449m • Gorse: $449m • Ragwort: $422m • Bomarea: $45m	Wilding conifer NB not separately reported (risk-adj $226m). Rabbit NB not reported (risk-adj $158m). Risk-adjusted total: $609m.
Environment Southland	Harris/LWP & Associates (terrestrial companion)	2018	6%	100 yr	Multiple terrestrial pests (companion methodology to ECan)	Positive net benefit (pest-level NPVs not separately published)	Companion methodology to ECan 2017; confirms positive net benefit for Southland programme.
Environment Southland	Sapere Research Group (Total Economic Value)	2026	2%	50 yr	Full biosecurity programme (wilding conifer focus)	BCR 14.4–20.2 (TEV) BCR 5.4–6.7 (use value only) Scale-back: BCR –7.3	Most recent ES analysis; uses Treasury 2024/15 discount rate. Range reflects sensitivity to programme scale.
Environment Southland	Harris/LWP & Associates (marine programme)	2015	6%	100 yr	Undaria pinnatifida (marine invasive algae)	Negative NPV (excl. biodiversity values)	Negative when biodiversity/non-use values excluded. Inclusion of biodiversity values reverses finding to positive.
Auckland Council	Auckland Council internal	c.2017	Not reported	Not reported	279 managed species (full programme)	Positive net benefit	Ecosystem services framework. Detailed NPVs not

Council	CBA author / model	Date	Discount rate	Time horizon	Key pests covered	Key quantitative result	Notes
	(ecosystem services)						publicly available. Largest council programme ($41m p.a.).
Greater Wellington RC	Wildlands Consultants / Lincoln Agritech	2018	Not reported	Not reported	Possums and broader pest portfolio	Positive net benefit	Specific NPV/BCR not publicly reported in data provided to TUK.
Taranaki RC	Wildlands Consultants / Lincoln Agritech	2017	Not reported	Not reported	44 pest species (full regional programme)	Positive net benefit	Consistent methodology with GWRC 2018. Specific NPV/BCR not publicly reported.
Gisborne DC	AgResearch / AgPest	2017	Not reported	10–30 yr	Gorse, nodding thistle	IRR >100% (both pests)	IRR exceeds 100% — investment case holds across any plausible discount rate.
Nelson / Tasman DCs	AgPest	2019	Not reported	Not reported	Broom, gorse, nassella tussock, boneseed	Positive NPV	Joint CBA covering combined NCC and TDC programmes. Specific NPV values not publicly reported.
Marlborough DC	AgResearch / AgPest (online CBA tool)	2017	4%	50 yr	CNG sustained control, nassella tussock, kangaroo grass (3 pests; Med. fanworm qualitative)	CNG: NPV $76m, IRR 15.1% Nassella: NPV $43m, IRR 12.9% Kangaroo grass: NPV $23m, IRR 11.2%	AgResearch online tool. All three terrestrial pests show IRR well above plausible discount rates.
Hawke's Bay RC	HBRC internal (RPMP CBA / AgResearch tool)	2018	4%	10 yr & 50 yr	Rooks, CNG, possums, privet (urban), feral cats, carp, didymo, Argentine ants, fire ants (9 pests)	8 of 9 pests positive (50yr NB): • Feral cats (WSPC): $864m • CNG: $450m; Rooks: $228m • Possums: $76m • Privet (urban): –$2.7m	Full 257-page RPMP CBA at 4%. Urban privet is sole negative individual pest result in dataset.
Horizons RC	Valueable Ltd (Social Return on Investment)	2025	Not reported	Not reported	Possum control programme	$1.63 per $1.00 invested (SROI)	SROI captures broader social value including wellbeing and community co-benefits.
Northland RC	NRC internal (cost of inaction)	2024	Not reported	Not reported	Caulerpa brachypus and Caulerpa parvifolia (marine invasive algae)	$40m–$98m PV (cost of inaction)	Present value of damages if Caulerpa management

Council	CBA author / model	Date	Discount rate	Time horizon	Key pests covered	Key quantitative result	Notes
							ceases. Range reflects spread uncertainty.
Wellington RC	Wellington RC internal (programme CBA)	c.2023	Not reported	Not reported	Possums, Caulerpa, broader pest management portfolio	Positive net benefit confirmed (programme-level)	WRC confirmed quantitative CBA per data response. Pest-level NPV not reproduced from data provided to TUK.

Table B.2: Harmonisation of Canterbury and Otago CBAs to Treasury discount rates

Council	Pest	Programme	Risk-adj NB at 6%/100yr ($m)	Adj factor to 2%	Approx NB at 2%/100yr ($m)	Adj factor to 8%	Approx NB at 8%/100yr ($m)
ECan	Wilding Conifers	Prog. containment	5.32	2.594	13.8	0.752	4.0
ECan	Nassella tussock	Prog. containment	136.2	2.594	353.2	0.752	102.4
ECan	Broom	Sustained control	—†	2.594	36.1	0.752	10.5
ECan	Gorse	Sustained control	—†	2.594	27.5	0.752	8.0
ECan	Rabbits	Sustained control	3.1	2.594	8.0	0.752	2.3
ECan	Rooks	Eradication	0.1	2.594	0.4	0.752	0.1
ORC	Wilding Conifers	Prog. containment	226.0	2.594	586.1	0.752	169.9
ORC	Broom (rural)	Sustained control	59.3	2.594	153.8	0.752	44.6
ORC	Gorse (rural)	Sustained control	59.3	2.594	153.8	0.752	44.6
ORC	Ragwort	Sustained control	76.5	2.594	198.4	0.752	57.5
ORC	Rabbits	Sustained control	158.0	2.594	409.8	0.752	118.8

ORC	Nodding thistle	Sustained control	1.6	2.594	4.2	0.752	1.2
ORC	Bomarea	Prog. containment	27.9	2.594	72.4	0.752	21.0
TOTAL			970.5		2,017.5		584.9

† Risk-adjusted net benefit not separately reported for ECan broom and gorse; unadjusted net benefit at 6% used (broom $13.9m, gorse $10.6m). Adjustment factor = AF(2%,100yr) / AF(6%,100yr) = 43.10 / 16.62 = 2.594. Risk-adjusted net benefit used where available; otherwise unadjusted. See Appendix A for methodology. ‡ The ORC 2018 CBA (Harris/LWP) covers approximately 20 pest programmes. This table harmonises the seven pests for which per-pest NPV data was reported in a form that could be mechanically rediscounted. The excluded ORC pests are predominantly smaller programmes; the seven harmonised pests represent the dominant share of economic value reported by ORC. ECan's CBA covers seven pests; all seven are included above.

Appendix C: Council-by-council data summary

Table C.1 shows programme scale data for all 16 RUAs.

Table C.1: Regional biosecurity programme data by council

RUA	RPMP period	Annual budget ($m)	FTE	Pests managed	Council-funded (%)	Central govt (%)	Data notes
Northland RC	2017–2027	15.40	45	143	70%	30%	
Auckland Council	2020–2030	41.00	60	279	99.6%	0.4%	FTE includes parks pest control
Waikato RC	2022–2032	16.71	23	65	75%	25%	Central govt co-funding hard to disaggregate (in-kind)
Bay of Plenty RC	2020–2030	7.57	20.2	103	57%	43%	
Gisborne DC	2017–2027	0.96	6	104	99%	1%	
Hawke's Bay RC	2018–2028	3.65	10.7	63	96%	0%	4% other funding
Taranaki RC	2018–2028	5.50	11.5	19	98%	2%	Excludes Predator Free $1.5m (50% govt)
Horizons RC	2017–2027	8.18	28.5	70	91.5%	8.5%	Includes NWCCP, CCD, DOC co-funding. Computed from budget numbers (HRC advised 92% council-funded)
Greater Wellington RC	2019–2039	13.24	74	46	75%	1%	74 FTE includes Key Native Ecosystems programme; biosecurity-only FTE is lower. Central govt share will rise to ~24% when PFW funding flows.
Nelson CC	2019–2029	0.31	2	98	95%	5%	Joint RPMP with Tasman
Tasman DC	2019–2029	0.39	4	98	90%	10%	Joint RPMP with Nelson
Marlborough DC	2018–2028	4.53	6	35	45%	54%	1% other funding
West Coast RC	2018–2028	0.72	3	42	90%	10%	Salary component estimated at $345,000 ($100k/FTE × 3)

Environment Canterbury	2018–2038	14.80	25	52	39%	61%	High central govt share reflects national wilding conifer and CCD programmes
Otago RC	2019–2029	6.89	18	51	75%	25%	
Environment Southland	2019–2029	2.50	9	73	59%	41%	41% MPI (wildings, CCD)
SECTOR TOTAL		142.37	345.9	1,341	78% (weighted average)		

Appendix D: Case study detailed data tables

1.1 Rooks (Corvus frugilegus)

Tables D.1 to D.3 present the full programme and cost-benefit data for the regional rook management programmes reviewed in Section 4. Table D.1 summarises programme type and expenditure by council. Table D.2 shows population trajectories since peak infestation. Table D.3 presents the CBA results used in Section 4.4.

Table D.1: Regional rook programme summary

RUA	Programme type	Annual cost ($/yr)	Current status
Active eradication or suppression			
Environment Canterbury	Eradication	—	Eradicated May 2023
Hawke's Bay RC	Active eradication	$133,924	198 nests (2025/26 season)
Horizons RC	Active eradication	$190,000	79 nests (2025/26 season)
Greater Wellington RC	Active eradication	$137,751	Sustained decline
West Coast RC	Active eradication	$54,000	<30 birds
Otago RC	Eradication	$10,000	~10 birds
Gisborne DC	Eradication	~$20,000	Eliminated (incursion response)
Bay of Plenty RC	Surveillance only	$2,462	No active population
Sub-total		$548,137	
Exclusion zone (boundary management)			
Marlborough DC	Exclusion zone	$26,000	Maintaining rook-free status
Environment Southland	Exclusion zone	$2,500	Maintaining rook-free status
Tasman / Nelson	Exclusion zone	—	Passive monitoring

Table D.2: Rook population trajectories by region

RUA	Baseline (peak)	Year of peak	Current estimate	Reduction (%)
Environment Canterbury	~5,600 birds	~2000	0 — eradicated	100%
Hawke's Bay RC	1,019 nests (~3,000 birds)	2003/04	198 nests (2025/26)	81%
Horizons RC	2,942 nests	~2007	79 nests (2025/26)	97%

Greater Wellington RC	Not formally surveyed	—	Sustained decline	>90% estimated
Waikato RC	~450 birds	—	<30 birds	>93%
Otago RC	~50 birds	—	~10 birds	~80%
Gisborne DC	9 birds (incursion)	—	0 — eliminated	100%
Marlborough DC	3 incursions detected	—	0 — all eliminated	Exclusion maintained

Table D.3: Cost-benefit analysis results — rook programmes

Study	Timeframe	Discount rate	Council cost NPV	Net benefit NPV	BCR
HBRC active eradication (LWP model)	10 years	4%	$1.06m	$23.7m	22:1
HBRC active eradication (LWP model)	50 years	4%	$1.78m	$227.7m	128:1
ECan eradication (post-completion phase)	100 years	2%	$0.05m	$0.37m†	n/a†
Horizons cost-of-inaction (annual basis)	Annual	—	$190,000/yr	$1.6m/yr avoided	n/a

† ECan CBA covers only the final eradication phase (1–3 birds remaining); not directly comparable with HBRC programme CBA. Use HBRC CBA as primary evidence for programme economics. See Section 3.4.

1.2 Chilean needle grass (Nassella neesiana)

Tables D.4 to D.6 present the full programme and cost-benefit data for the regional CNG management programmes reviewed in Section 5. Table D.4 summarises invasion status and programme objectives by council. Table D.5 shows present value of production losses under a do-nothing scenario. Table D.6 presents the CBA results used in Section 5.4.

Table D.4: CNG invasion status and management by region

RUA	Programme type	Infested area (ha)	Potential range at risk (ha)	Management objective	Annual cost ($/yr)
Core infestation zone					
Environment Canterbury	Sustained control	525	—	Contain and reduce infestation	$260,000
Marlborough DC	Sustained control / eradication	2,642	—	Reduce infestation below economic threshold	$390,000
Hawke's Bay RC	Total control / eradication	199	397,578	Eradication from region	$125,134

Sub-total (excl. MDC)		~724			$775,134
Exclusion boundary zone					
Horizons RC	Exclusion / boundary control	—	3,960,000 (national at risk)	Prevent spread beyond current range	$19,000
Tasman DC	Exclusion / boundary control	—	—	Prevent establishment	$5,500
Waikato RC	Exclusion / boundary control	—	—	Prevent establishment	$2,940
Environment Southland	Exclusion / boundary control	—	—	Prevent establishment	$2,500
Sub-total exclusion councils					$29,940
GRAND TOTAL (excl. MDC)		~3,528			$805,074

† MDC cost is per data response to H|W is 2,642. National infestation area: 3,099 ha (PLOS ONE 2024) vs 3,528 ha (sum of council figures); discrepancy likely reflects timing of data collection.

Table D.5: Present value of production losses under do-nothing scenario (Bourdôt & Buddenhagen 2023)

Spread scenario	Years to 90% occupation of potential range	National ($m)	Canterbury ($m)	Hawke's Bay ($m)	Marlborough ($m)
Slow spread (base case)	201 years	$192.4m	$22.8m	$16.9m	$22.8m
Fast spread (climate change)	100 years	$1,160.1m	$159.0m	$112.8m	$53.5m

Source: Bourdôt & Buddenhagen (2023), PLOS ONE. Discount rate 3%. Potential range: 3,960,000 ha of national pastureland.

Table D.6: Cost-benefit analysis results — CNG programmes

Study	Scenario	Timeframe / rate	Net benefit NPV	BCR	Notes
LWP (2017) — ECan	Sustained control	6% / 50 yr	$3.61m	2.2:1	
LWP (2017) — ECan	Progressive containment	6% / 50 yr	−$3.78m	0.7:1	
LWP (2017) — ECan	Eradication	6% / 50 yr	−$5.80m	0.6:1	
LWP (2017) — ECan	Do nothing	6% / 50 yr	−$7.00m	—	Baseline

AgResearch (2017) — MDC/ECan	Sustained control	4% / 50 yr	$16.5m	—†	
AgResearch (2017) — MDC/ECan	Do nothing	4% / 50 yr	−$32.1m	—	Baseline

† AgResearch (2017) does not report a BCR in comparable form to LWP (2017); results are not directly comparable due to different cost assumptions. Both studies confirm sustained control as the only positive-value management option.

Appendix E: Biodiversity indicator shortlist and confidence ratings

Table E.1 summarises the biodiversity outcomes reported by 16 RUAs as part of this study. Confidence ratings are Heuser|Whittington's and follow the three-tier scale defined in Appendix A: A = quantified outcomes with direct attribution; B = monitored trends with plausible attribution; C = directional evidence. Of 16 RUAs, 4 achieved Confidence A, 4 Confidence B, and 8 Confidence C.

Table E.1: Biodiversity programmes and outcomes by RUA

RUA	Programme delivering biodiversity outcome	Species or ecosystem benefiting	Monitoring method	Key metric or outcome	Confidence
NRC	6 High Value Area (HVA) programme (~152,500 ha combined): Kiwi Link, Whangarei Heads, Tutukaka, Piroa-Brynderwyn, Mid North, and Waipoua; predator and pest mammal control ($800k/yr HVA investment)	North Island brown kiwi; mustelids, cats, and possums (prey base reduction); native biodiversity at HVA sites	Annual trap catch monitoring across all HVAs; kiwi population monitoring (Backyard Kiwi programme, Whangarei Heads)	Trap catches: 55,523 (2022–23) → 83,648 (2023–24) → 67,410 (2024–25); mustelids: 1,662 → 2,140 → 2,188; Backyard Kiwi (Whangarei Heads) population increasing	B
ECan	Wilding conifer containment; rabbit and weed control	Native tussock grassland, wetlands	Aerial and ground surveillance	Reduced encroachment on native ecosystems; recovery of native grassland cover	C
HBRC	Rook eradication; possum control; weed management	Native bush margins, riparian habitat	Pest population monitoring	Reduced browsing pressure on native vegetation; co-benefits from rook decline	C
MDC	Possum control (D'Urville Island); wilding removal (Molesworth/Wairau)	Mistletoe (Peraxilla spp.); native forest canopy; braided river habitat	Visual abundance surveys; possum population monitoring	Mistletoe abundance on D'Urville Island directly attributed to possum absence; 60 endemic species supported	B
GWRC	Predator control (Baring Head); possum management	Lizard populations (skinks and geckos); native bird habitat	Hedgehog tracking tunnels; lizard pitfall trapping	Concurrent hedgehog decline and lizard increase confirmed by pitfall trapping	B
Horizons RC	Integrated possum control (Te Apiti, Totara Reserve, Kia Wharite, Waimarino Forest)	Kiwi (Apteryx spp.); whiō / blue duck (Hymenolaimus malacorhynchos)	Annual kiwi call count monitoring;	Kiwi: 209 birds (2009) → 405 birds (2023); whiō: 15 pairs → 50–55 pairs	A

			whiō pair counts		
Waikato RC	Pest control at DOC Ecological Management Units and priority biodiversity sites	Native species at priority sites (species not named in response)	No ecological monitoring reported	Programme overlap with biodiversity sites confirmed; no direct outcome evidence provided	C
BoPRC	Pest plant and animal control across catchments	Riparian and coastal native vegetation	Catchment monitoring	Biodiversity co-benefits documented alongside catchment restoration outcomes	C
GDC	Possum control (Upper Waimata catchment)	Native forest canopy; browsing-sensitive native species	Browse Magnitude Index (BMI) monitoring	BMI reduced from 62% to 10% across 4,274 ha	A
TRC	Possum control (Taranaki Maunga programme)	Native forest canopy; native bird populations	Possum Residual Trap Catch (RTC) monitoring; vegetation assessment	RTC increased from ~6% to >10% over 5 years following reduction in control effort — confirming importance of continued control	B
TDC	Weed and pest control (Tasman / Abel Tasman margins)	Sub-alpine native ecosystems; native bird habitat	Site monitoring at managed locations	Wilding conifer removal restoring sub-alpine native ecosystems; biodiversity co-benefits alongside pastoral restoration	C
NCC	Marine biosecurity (Mediterranean fanworm — Sabella spallanzanii)	Coastal reef ecosystems; native marine biodiversity	Annual dive surveys at known fanworm sites	Mediterranean fanworm: 30 known sites → 0 confirmed sites since 2022–23; 6 species confirmed eradicated	A
WCRC	Predator Free Te Kinga (joint Council–DOC)	Native forest canopy; native bird populations	Possum RTC; vegetation condition monitoring across 11,000+ ha mixed tenure	Breeding possum population removed from 4,000 ha; confirmed improved native forest condition	C
ES	Wilding conifer control (Southland); marine pest surveillance (Fiordland)	Sub-alpine tussock and native grassland;	Wilding spread monitoring; marine surveillance	Wilding control delivers biodiversity and pastoral restoration simultaneously;	C

		Fiordland marine ecosystems		Fiordland partnership with DOC	
ORC	Rabbit and weed control; wilding conifer management	Native tussock grassland; dryland ecosystems	Pest population and vegetation monitoring	Reduced grazing pressure on native tussock; wilding containment protects native grassland	C
Auckland Council	Sustained pest control — Hūnua Ranges (Kohukohunui); kauri dieback (Phytophthora agathidicida) management; co-funder of Te Korowai o Waiheke predator eradication programme (Waiheke Island)	Kōkako (Callaeas wilsoni); kauri (Agathis australis); kākā (Nestor meridionalis — Waiheke, via TKOW partnership)	Kōkako breeding pair counts (Hūnua Ranges); kauri dieback site surveillance; Hūnua Ranges kauri population health monitoring survey (2023)	Kōkako breeding pairs 55 (2014) → 259 (2022), a 370% increase attributable to mammalian pest management in Hūnua Ranges (Auckland Council Parks Team, 2026). Kauri dieback pathogen confirmed absent from Hūnua Ranges. Waiheke (Te Korowai o Waiheke, co-funded by Auckland): 300% increase in kākā	A

Sources: Council data responses (March–April 2026) and RPMPs. Confidence ratings assigned by Heuser|Whittington based on specificity of monitoring evidence and strength of attribution.

Appendix F: References and data sources

This appendix lists all sources cited in this report, in three groups: (A) published reports and research; (B) RUA cost-benefit analyses and RPMP documents; and (C) unpublished council data responses to Heuser|Whittington data requests. Two entries in Section A are flagged for citation confirmation before final publication.

A. Published sources

Entries are listed alphabetically by lead author or organisation.

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B. RUA documents and cost-benefit analyses

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Horizons Regional Council (2015). Costs and Benefits Supporting Document for the Regional Pest Management Plan 2016. Palmerston North: Horizons Regional Council.

Land Water People Ltd (LWP) (2017). Pest Plant Cost-Benefit Analysis for the Environment Canterbury Regional Pest Management Plan. Prepared for Environment Canterbury. [Also referred to as the Harris/LWP CBA. The same modelling framework was applied for Otago Regional Council and Environment Southland.]

C. Council data responses (unpublished, March–April 2026)

All 16 regional and unitary authorities in Te Uru Kahika were invited to provide programme data. All responded with data on annual budgets, FTE, pest species and area coverage, funding sources, and biodiversity monitoring. Data responses are held on file by Heuser|Whittington and are available to TUK on request. Responding councils are listed below.

Auckland Council
Bay of Plenty Regional Council (BoPRC)
Environment Canterbury (ECan)
Environment Southland (ES)
Gisborne District Council (GDC)
Greater Wellington Regional Council (GWRC)
Hawke's Bay Regional Council (HBRC)
Horizons Regional Council
Marlborough District Council (MDC)
Nelson City Council (NCC)
Northland Regional Council (NRC)
Otago Regional Council (ORC)
Taranaki Regional Council (TRC)
Tasman District Council (TDC)
Waikato Regional Council (WRC)
West Coast Regional Council (WCRC)